Republic of the Gambia

United Nations Convention
to Combat Desertification

National Drought Plan

GAMBIA – UNCCD DROUGHT INITIATIVE
Ministry of Environment, Climate Change and Natural Resources, GIEPA Building
Pipeline Road, Gambia

Developed for the
The Drought Task Team

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TABLE OF CONTENTS

FORWARD

Drought is climate related and according to the World Meteorological Organization (WMO), climate change is projected to increase the frequency, intensity, and duration of droughts, with impacts on many sectors, in particularly food, water and energy. The Sahelian zone including The Gambia is particularly prone to drought. There is the need to develop policies and strategies to address this insidious phenomenon and plan for the humanitarian and development consequences of the drought related disasters that tighten their grip overtime, gradually destroying lives and livelihoods. The planning process must move beyond a crisis-driven approach and develop integrated risk-based national drought plan that provides an integrated overview of activities meeting the national and sub-national needs and building resilience and sustainable livelihoods.

The Gambia National Meteorological and Hydrological Services (NMHS) in collaboration with other national partners (MoA, MoHSW, MECCNAR, etc), Regional partners including the AGRHYMET and continental partners including the African Centre for Meteorological Applications and Development (ACMAD) are making giant strides to provide timely warnings and forecasts on droughts and other climate hazards to The Gambia. Models have been developed to monitor rainfall, food crop water requirements satisfaction and prospective yields, the progress of vegetation front and its different seasonal and inter-annual variations – phenomena that are negatively affected by drought. Starting from May each year, a monitoring is implemented every 10 days at both regional and national levels by the multidisciplinary working groups that issue decadal and/or monthly bulletins to inform decision makers on the evolving agro-pastoral and hydrological situations. Those bulletins contain several chapters, going from the interpretation of the results of the regional seasonal outlook forum on rainfall and hydrological forecasts, to the analysis of the rainfall and hydrological situations, the progress of sowing, the assessment of crop water requirements satisfaction and potential yields using field data and agro-meteorological models, the status of pastures using vegetation indices, and the estimation of regional cereal/food balance. The information provided serves to inform policy and decision making on a daily, seasonal and annual basis. The services from these organizations have evolved from tackling only drought related issues to addressing all climate and climate change hazards, including climate change impacts and adaptation assessments on agriculture, water resources fisheries and other key sectors of the economy.

This National Drought Plan is linked to the National Climate Change Policy; the medium-term National Development Plan (2018-2021); key climate and climate change strategies including the National Adaptation Programme of Actions (NAPA), the Special Programme for Climate Resilience (SPCR), the Low Emissions Climate Resilience Development Strategy; the Climate Change Adaptation and Disaster Management (CCADM) and the National Disaster Management Strategic Action Plan under the National Disaster Management Agency; and the National Adaptation Plans (NAPs) process at country level. The Action Plan has priority implementation actions that include (a) establishment of a Technical Drought Action Group; (b) compilation and publication of historical and current statistical information on drought impacts around the country as a snapshot in time; (c) identification of future vulnerabilities and impacts across sub-national and national jurisdiction and also across relevant sectors of the economy; (d) identification, design and operationalization of an environment and climate change data base at the National Meteorological Agency of The Gambia with nodes at relevant government departments; and (e) design and implementation of a Comprehensive Water Resources Management Programme for The Gambia.

Monitoring and evaluation of the Plan will be assured with the development and implementation of a Monitoring, Reporting and Verification Framework.

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Honourable Minister
Ministry of Environment, Climate Change
and Natural Resources

APPRECIATIONS

The Ministry of Environment, Climate Change and Natural Resources gratefully acknowledges the Global Mechanism of the United Nations Convention to Combat Desertification for the financial support that made possible the execution of the present study.

Special thanks and appreciation go to the Director of the Department of Forestry who is also the Focal Point of the Drought Initiative and Mr. Alpha Jallow, the UNFCCC Focal Point for their effective coordination and, constructive and thoughtful support throughout the project.

The development of this Plan was undertaken by the Drought Task Force that was constituted by the Director of Forestry and the UNFCCC Focal Point with close collaboration with the National Consultant

Sincere thanks to the following individuals and institutions for their unwavering support and collaboration during the study.

- Mohammed Jaiteh, Focal Point, Drought Initiative
- Alpha Jallow, UNFCCC Focal Point
- Dr. Buba Manjang, Medical and Health Services
- Bubu Pateh Jallow, National Consultant

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Mr. Pateh Jah
Permanent Secretary
Ministry of Environment, Climate Change
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ACCRONYMS

AFD	French Development Agency
AGRHYMET	Agriculture, Hydrology, Meteorology
ANR	Agriculture and Natural Resources
ANRWG	ANR Working Group
ARC	Africa Risk Capacity Agency
ASIS	Agriculture Stress Index System
CCADRM	Climate Change Adaptation and Disaster Risk Management
CED	Climate and Environment Division of FAO
CEDAW	United Nations Convention on the Elimination of all forms of Discrimination against Women
CILSS	the Inter-state Committee to fight against drought in the Sahel
CND	Convention on Biological Diversity
CRR	Central River Region
DANIDA	Danish International Development Agency
DFID	UK Department for International Development
DOA	Department of Agriculture
DPWM	Department of Parks and Wildlife Management
DRR	Disaster Risk Reduction
DWR	Department of Water Resources
ECOWAS	Economic Community of West African States
FAO	Food and Agriculture Organization
GBA	Greater Banjul Area
GCF	Green Climate Fund
GDP	Gross Domestic Product
GEAP	Gambia Environmental Action Plan
GIEWS	Global Information and Early Warning System
GM	Global Mechanism under the UNCCD
GTB	Gambia Tourism Board
GWP	Global Water Partnership
IDB	Islamic Development Bank
IFAD	International Fund for Agricultural Development
ISDR	International Strategy for Disaster Reduction
JAS	July, August and September
KMC	Kanifing Municipal Council
LDCF	Least Developed Countries Fund
M&E	Monitoring and Evaluation
MOA	Ministry of Agriculture (MoA)
MECCNAR	Ministry of Environment Climate Change and Natural Resources
MoFWRNAM	Ministry of Fisheries and Water Resources and National Assembly

	Matters
MoH&SW	Ministry of Health and Social Welfare
MRV	Monitoring, Reporting and Verification
NaNA	National Nutrition Agency
NAP	National Action Programme to combat desertification, land degradation & drought in The Gambia
NAPA	National Adaptation Programme of Action on Climate Change
NARI	National Agricultural Research Institute
NAWEC	National Water and Electricity Corporation
NBR	North Bank Region
NBSAP	National Biodiversity Strategy and Action Plan
NCCP	National Climate Change Policy
NDMA	National Disaster Management Agency
NDP	National Development Plan (2018 – 2021)
NEA	National Environment Agency
NEMA	National Agricultural Land and Water Management Development Project
NEMA	National Environmental Management Act
NEMC	National Environmental Management Council
NFAP	National Forestry Action Plan and Strategy
NFF	National Forest Fund
NGO	Non-Governmental Organization
OMVG	a French acronym for River Gambia Development Authority
PA	Protected Area
PAGE	Programme for Accelerated Growth and Employment (2012-2015)
PRSP/SPA	Poverty Reduction Strategy Paper/Strategy for Poverty Alleviation
PSU	Planning Services Unit of the Department of Agriculture
PURA	Public Utilities and Regulatory Authority
SCF	Special Climate Funjd
TAG	Technical Advisory Group
TDA	Tourism Development Area
TVET	Technical and Vocational Education and Training
UNCCD	United Nations Convention to Combat Desertification
UNFCCC	United Nations Framework Convention on Climate Change
WB	World Bank Group
WCR	West Coast Region
WFP	World Food Programme
WSI	Water Supply Index

EXECUTIVE SUMMARY

Drought is a slow onset disaster that tightens its grip over time. In most cases drought is a lack of rainfall leading to inadequate water supply for plants, animals and human beings, can inflict devastating effects on life and livelihoods and may result in food insecurity, famine, malnutrition, epidemics and displacement of populations. It also significantly impacts sectors such as agriculture, livestock and water resources with serious ramification to socio-economic and livelihood activities. The IPCC reports that climate change is projected to increase the frequency, intensity, and duration of droughts, with impacts on many sectors, in particularly food, water and energy.

The Gambia experienced the drought of the 1970s and the subsequent droughts and low rainfalls/variable seasons that followed to up recent years. The impacts experienced differ from year to year and also across the country. These impacts ranged from loss of crops, hunger, malnutrition, increased poverty, loss of animals, reduced surface water availability (lakes, ponds), increased urban migration and reduced national economic performance.

At UNCCD COP-13, the UNCCD institutions and bodies were requested to implement a drought initiative in the biennium 2018-2019 at national level. A key element of the initiative is to support countries build drought resilience by implementing concrete actions for drought preparedness. The intent is to boost the resilience of people, communities and ecosystems against drought by being prepared and acting early. The preparation of this document is funded by the UNCCD to meet request of the above, with the main objective of responding to international initiatives and having in the Gambia a national drought plan which can respond at any time in the event of drought or extremely low rainfalls.

*National and sectoral policies and regulations related to the drought initiative in The Gambia include the **'The Gambia Incorporated Vision 2020)**' to which all the legislation, policies and strategies in place in The Gambia that are aligned. The national and sectoral medium term strategies are developed with the objectives of implementing the VISION 2020.*

*The National Climate Change Policy sets out comprehensive and crosscutting policy directions to implement national development strategies in a climate-resilient manner, drawing on all sectors of the population in a spirit of partnership and collaboration. The Forestry Policy and Regulations have the principal objective of checking land degradation, in order to restore the natural balance and sustain the production and use of forest resources. The Climate Change and Forest policies recognize government's strategic shift towards poverty reduction and economic growth, which underpins vision 2020, the Gambia Environment Action Plan, Local Government Reforms and Decentralization, Strategy for Poverty Alleviation II (Poverty Reduction Strategy Paper), National Action on Desertification, etc. The provisions will accommodate government's decentralization process; and demand driven "bottom-up approach" strategy of the Local Government Act, 2002. This Act places management responsibilities on the Local Government Area Councils for a range of natural resources under their jurisdiction. **The Water resources policies and regulations make provisions to promote the (a)** centralized inventory and management of all water resources in the country; (b) most rational use of the available water resources, including the abatement of its harmful effects such as flooding, soil erosion, siltation and salinisation; and (c) preparation of sectoral water plans, sub-basin plans, basin and master water plans to serve as terms of reference for allocating sectoral uses of water. The **Health Sector Emergency Preparedness and Response Plan Related to All Hazards** (2017 - 2019) addresses a number of climate related hazards as well as underlining the cross-sectoral cooperation in addressing health sector hazards (drought, floods, bush fires, windstorms, locust invasions, environmental degradation and epidemics), many of which could be construed as being climate-change related. **The Women's** Act enshrines the right of every woman to live in a healthy and sustainable environment and that The Government shall take appropriate measures to mensure greater participation of women in the planning, management and preservation of the environment and the sustainable use of natural resources at all levels. The **Strategic Action Plan for the Disaster Management Programme** (2008-2011) has an overall vision: Assurance of safer and resilient communities in which the impact of*

hazards would not hamper development and the ecosystem and provision for a better quality of life will be achieved through effective emergency and disaster services; with, as policy goal: to ensure a proper and effective mechanism for disaster mitigation and preparedness that will save lives and livelihoods in the country. The parks and wildlife sub-sector policy will be addressing the underlying causes of biodiversity loss through greater and systematic involvement of the population, in particular satellite local communities, in their effective management and the specific parks and wildlife policy goal will continue to be the expansion of protected areas coverage of 10% of total surface area.

In this Drought Plan, management is centered around (a) risk identification based on baseline knowledge on hazards, vulnerabilities and priorities at any given level; (b) monitoring on how those risks and vulnerabilities change through time; (c) response capability of potentially affected communities that enables them to reduce risk once trends are spotted and announced through, for example, pre-season mitigation activities, evacuation or duck-and-cover reflexes; and (d) warning communication, whereby the monitoring information is packaged into actionable messages understood by those that need, and are prepared, to hear them. In The Gambia there is the Multidisciplinary Working Group (MWG) that technically monitors and reports on the weather and climate of the season. The National Meteorological Agency provides valuable information on climate science in the country, other sectors, such as Agriculture, Livestock, Forestry, Fisheries and Health also provide valuable monitoring and warning data and information which is packages and used to develop the 10-day National Agro-meteorological Bulletin. The National Disaster Management Agency unpacks the Bulletin and develops the relevant warming communication and provides the same to the National Disaster Management Forum which is the policy body responsible for the declaration and dissemination of disaster communication including drought incidence, continuation and termination.

The Republic of The Gambia is ill prepared for droughts and other disasters, especially under a warming climate. Some of the issues on the current status of the country on drought preparedness include (a) low institution capacities and resources of the existing Government bodies to deal with drought issues; (b) often drought/crop failures responses are coordinated through several Agencies, both Governmental and Non-Governmental with little central coordination; (c) inventions in terms of reliefs/aids are directed toward human relief and recovery with little or no post-drought/crop failures evaluation of responses undertaken; (d) None existence of a formal drought/crop failure contingency plan; (e) the current early warnings can serve drought and famine but need to be instituted in a national drought policy (which does not exist) and a drought plan; and (f) drought/crop failure mitigation actions mainly focus on economic and crop diversification and poverty reduction measures, increasingly viewed as part of the development process with drought policy lacking.

The current water sources of the country are three; atmospheric rain water, surface river water and groundwater. These sources rely very much on the weather and climate parameters, particularly, rainfall. The availability of freshwater in the river is influenced by movement of salt water from the ocean into the estuary of the river which is dependent on the amount rain available during the rainy season. Rainfall is the only means of recharge of surface and groundwater sources. Hence, any prolonged drought or deficient rainfall has the potential to affect these two water sources with serious consequences that can lead to water scarcity and the resulting hardship with probable conflicts.

Because all droughts arise from inadequate or lack of water, effective assessment and monitoring of the national water resources will be essential. Assessment and monitoring programs should be developed according to different risk scenarios for each locality; however, some actions must be guaranteed during drought situations. Emergency situations such as droughts lead to discussions about universal access to safe water and sanitation, the use of new technologies to minimize waste, water treatment in emergencies, and water saving measures. Wells (some traditional, some modern concrete line wells) and boreholes (shallow and deep) are the main means of abstracting ground water for public and private uses.

Hence the need to develop new and alternative water sources is essential as a way of mitigating drought and deficient rainfall in the country through rain water harvesting from roof tops in residential areas; rain water harvesting from surface run-off through creation of reservoirs in low-land areas in the country; and improvement of potable water supply infrastructures in both urban and rural settlements.

This National Drought Plan thus contains a Drought Action Plan with priority implementation actions. A variety of strategies and actions contained therein will pursue and improve the resilience of the country's economy especially the sectors (agriculture, water resources, fisheries, forestry, parks and wildlife, etc) that are climate and rainfall dependent. These investments must be made as part of a comprehensive plan that includes, for the water resources sector, expanded water conservation, water recycling, storm water capture and reuse, local and regional water storage, groundwater management and other strategies to ensure water supply reliability and ecosystem health in The Gambia. For the forestry and parks systems, tree growing using indigenous trees which are climate and climate change resilient would work under harsh conditions including droughts.

The following key actions are relevant to the development and implementation of the Gambia National Drought Plan.

1. *Establish a Technical Drought Action Group to share information and develop recommendations to address the current and prepare for future drought conditions under projected climate change;*
2. *Compile and publish historical and current statistical information on drought impacts around the country as a snapshot in time;*
3. *Under scenarios of continuing and future (e.g. 10, 15 or 20 years) drought conditions, identify future vulnerabilities and impacts across sub-national and national jurisdiction and also across relevant sectors of the economy (water, agriculture, forests, wildlife protection, ecosystems, commercial industries, trade, etc.)*
4. *Design and operationalize an Environment and Climate Change Data Base at the National Meteorological Agency of The Gambia with Nodes at relevant departments that include National Environment Agency, National Disaster Management Agency, Department of Agriculture, Department of Forestry, Department of Parks and Wildlife Management, Department of Water Resources, Department of Livestock Services, Department of Fisheries and Department of Health Services.*
5. *Design and implement a Comprehensive Water Resources Management Programme for The Gambia that will respond to current climate and climate change related drought conditions at the sectoral, sub-national and national levels.*
   - 5.1. *Conduct a comprehensive study with results to inform the process of updating all natural resources and other relevant policies and regulations and facilitate long-term solutions for sustainability in the applicable natural resources, particularly, water management plans;*
   - 5.2. *Update the National Water Resources Master Plan including the design, promotion, facilitation and encouragement of innovative water supply technologies such as irrigation that may be needed under a water-stressed economy due to projected climate change.*
   - 5.3. *Policy and institutional reforms in the water resources sector (e.g., relocation of abstraction points, changes in pumping policies of deep wells and boreholes, flow regulation, licensing and permits for withdrawal of river water for irrigation and increase water column in wells)*
   - 5.4. *Creation of new surface and groundwater storage and improved distribution systems at the Municipal and Regional Administrative levels to help address the nation's projected stresses in the surface and groundwater resources under changing climate related drought conditions.*
   - 5.5. *Development and implementation of medium and long-term water infrastructure and technology plans and strategies to ensure reliable and sustainable water supplies for both the economy and the environment; and improvement of distribution at the Municipal and Regional Administrative levels.*

1. BACKGROUND

The Gambia is part of the Sahelian Region of West Africa and shared the same climate pattern of the sub-region which differs from south to north. The Gambia as part of the Sahel region has experienced three types of rainfall periods from 1950s to recent years. These periods are 1950s to 1968/69, 1970 to 1993 and from 1994 to recent years; the second period from 1970 – 1993, was when most severe droughts were experienced in the sub-region. For simple understanding, drought is generally defined as an extended period (a season, a year, or several years) of deficient precipitation compared to the statistical multi-year average for a region that results in water shortage for some activity, group, or environmental sector. Drought affects all parts of our society, from food production to public health, and there is a growing need to help countries, communities, agriculture, businesses, and individuals threatened by drought to plan accordingly. Drought gives rise to series of environmental, ecological, social and economical impacts. It also significantly impacts sectors such as agriculture, livestock and water resources with serious ramification to socio-economic and livelihood activities.

The Gambia experienced the drought of the 1970s and the subsequent droughts and low rainfalls/variable seasons that followed to up recent years. The impacts experienced differ from year to year and also across the country. These impacts ranged from loss of crops, hunger, malnutrition, increased poverty, loss of animals, reduced surface water availability (lakes, ponds), increased urban migration and reduced national economic performance.

Nationally, to minimize or mitigate the impact of drought in the country, several initiatives were taken at national level. New crop varieties were introduced both on cereals (millet, sorghum, sesame) and groundnuts (cash crop) which are of short cycle and more drought-tolerant. The cultivation of water melon and agroforestry was introduced and encouraged across the country. At institutional level, the National Agricultural Research Institute (NARI) and National Disaster Management Agency (NDMA) were established. The first was spearhead agricultural research into new crop varieties and farming practices in the face droughts and low rainfalls, the latter is tasked to manage natural disaster response measures and interventions.

Regionally, the Inter-state Committee to fight against drought in the Sahel (CILSS) and its training Centre; AGRHYMET (Agriculture, Hydrology, Meteorology) were established with headquarters in Ouagadougou, Burkina Faso and Niamey , Niger respectively. The first was to coordinate at political level interventions on combating the impacts of droughts in the sub-region and second is to conduct trainings for citizens of CILSS in the fields of Agrometeorology, Hydrology, Crop Protection and instruments and computer with aim of building national capacities in responding to the impacts of drought at national level.

Internationally, at the Conference of the Parties by its decision 29/COP.13), the UNCCD institutions and bodies are requested to implement a drought initiative in the biennium 2018-

2019 at national level. A key element of the initiative will be to help countries build drought resilience by implementing concrete actions for drought preparedness. The intent is to boost the resilience of people, communities and ecosystems against drought by being prepared and acting early.

The preparation of this document is funded by the UNCCD to meet request of the above, with the main objective of responding to international initiatives and having in the Gambia a national drought plan which can respond at any time in the event of drought or extremely low rainfalls.

1.1 Purpose, Scope, Goals and Objectives

1.1.1 Purpose

The purpose of this plan is to provide a national mechanism whereby, Government and stakeholders, both national and international can effectively and systematically assess drought conditions, develop mitigation actions and programs to reduce risk in advance of drought, and develop response options/actions that minimize economic losses/stresses, environmental losses and social hardships during drought.

1.1.2 Scope

The scope of the plan is national, covering the whole country and all sectors. It will have an implementation institutional arrangement from high level in Government (Office of the President/Vice President) to technical level (technical institutions) with an institutional focal point.

1.1.3 Goals

The overall goal is to enable the country to prepare itself in responding to disasters, particularly droughts with regards to assessing, risk based national drought management policies and interventions. The specific goals are:

- **i.** Setting a functioning National Drought Taskforce responsible the implementation of the National Drought Plan;
- **ii.** Identifying and setting National Office with authority to declare drought and authorizing resources mobilization and intervention actions;
- **iii.** Formulate/strengthen national policies on natural disasters, particularly droughts with good management strategies;
- **iv.** Strengthen key institutions on capacity needs (human, material) from national to local levels in implementing the drought plan implementing risk based management;
- **v.** Establishing a national Drought Monitoring and Early Warning Systems
- **vi.** Setting an Emergency Relief and Response mechanism

1.1.4 Objectives

Generally, the objective of this plan, is to provide Government in collaboration with national and international partners with an effective and systematic means of assessing drought conditions, developing mitigation actions and programs to reduce risk in advance of drought, and developing response options/actions that minimize economic losses/stresses, environmental losses and social hardships during drought. Specifically, the objectives of the plan will be following:

i. Collect, analyze and disseminate drought-related information in a timely and systematic manner.
ii. Establish criteria for declaring drought and triggering various mitigation and response activities.
iii. Provide an organizational structure that assures information flows between and within levels of government, as well as with Non Governmental organizations, and define the duties and responsibilities of all agencies with respect to drought.
iv. Maintain a current inventory of drought assistance programs used in assessing and responding to drought emergencies, and provide a set of appropriate action recommendations.
v. Identify drought prone areas and vulnerable sectors, population groups, and environments.
vi. Identify mitigation actions that can be taken to address vulnerabilities and reduce drought impacts.
vii. Provide a mechanism to ensure timely and accurate assessments of drought's impacts on key sectors and other areas, as well as specific population groups.
viii. Keep the public informed of current conditions and response actions by providing accurate, timely information to media in print and electronic form.
ix. Establish and pursue a strategy to remove obstacles to the equitable allocation of water during shortages and provide incentives to encourage water conservation.
x. Establish a set of procedures to continually evaluate and periodically revise the plan so it will stay responsive to the needs of the people and government ministries.

1.2 Plan Development Process

The steps in the drought policy and preparedness process are:

Step 1: Appoint a National Drought Plan Task Force
Step 2: Define the Goals/Objectives of the Drought Plan
Step 3: Seek Stakeholder Participation
Step 4: Inventory/Situational Analysis
Step 5: Prepare/write the National drought Plan
Step 6: Identify unmet needs and fill institutional gap
Step 7: Communicate /Educate
Step 8: Evaluate the plan

2. RELATIONASHIP TO OTHER PLANS AND POLICIES

2.1 Related National and Sectoral Policies and Regulations

In 1996, the Government adopted a long-term strategy for accelerated and sustainable development, ***'The Gambia Incorporated Vision 2020 (see BOX below)'*** in order to transform The Gambia into a middle-income nation. The Gambia's medium-term strategies (PRSP/SPA, PAGE and NDP) have been developed with implementation modalities for Vision 2020. Under this section, the legislation, policies and strategies in place in The Gambia that are aligned to the VISON 2020 and the medium strategies and that are directly or indirectly related to addressing climate change and drought management are discussed. Much of the legislation in The Gambia pre-dates climate change awareness. The sectoral silos have hampered mainstreaming climate change, with the tendency to leave everything to do with environment and climate change to the MoECCNAR, without necessarily seeing these challenges as being cross-sectoral. While climate change is now being addressed in new draft legislation (e.g. water resources) and in strategies (e.g. agriculture and natural resources; forestry), existing legislation – where it addresses the topic at all –is mostly restricted to environmental impact assessments of a very limited nature. Changes in this would require changes in the National Environment Management Act and its associated regulations to move from a requirement that an environmental impact assessment determines whether a project will have "any adverse impact on the environment" to a requirement to specifically address climate change as part of the long-term, multi-sectoral impacts of an intervention, and to include provisions for enforcement. For example, there are presently numerous user conflicts between different stakeholders with respect to the management of coastal resources such as fisheries, mining of minerals (sand, ilmenite), agriculture and forestry.

Vision 2020: The long term objectives of Vision 2020 are to address poor savings through improvements in output from the real sectors and enhancing financial intermediation. A liberal market economy with undue administrative interference shall improve the overall efficiency and competitiveness of the Gambian economy. The role of Government shall be limited strictly to the production of public goods which cannot be produced by the private sector while conducting a vigorous decentralization drive to ensure a more democratic process in the allocation, management and control of resources.

2.1.1 The National Climate Change Policy:

The National Climate Change Policy (NCCP) represents a significant step forward, with many progressive and necessary provisions designed to ensure a coherent and effective approach to reducing vulnerability to climate change and building adaptive capacity and resilience. There is inadequate consideration of climate change in sector policies, while skills and capacity levels to

mainstream and decentralize the climate change response are insufficient. It is therefore clear that an overarching policy framework is needed to steer the transition to a climate-resilient society, within a thriving low-emissions economy. This NCCP has the intention to provide the framework for managing climate risks, building institutions and capacities, and identifying new opportunities for climate-resilient sustainable development in The Gambia. It sets out comprehensive and crosscutting policy directions to implement national development strategies in a climate-resilient manner, drawing on all sectors of the population in a spirit of partnership and collaboration. This National Drought Plan is thus aligned to and will support the implementation of the NCCP, both geared towards climate resilience and transitioning The Gambia from current brown to green economy.

2.1.2 The Forestry Policy (2010-2019) and the Forest Regulations:

The Government recognized the prospects of a balanced ecosystem in advancing the socioeconomic development of the country. The policy framework for sustainable natural resource management put an adequate forest cover at the centre front. The preceding Forest Policy (1995 – 2005), proclaims that, a forest cover of 30% and placing 75% of the forest cover under local community and private sector management is sufficient for maintaining an ecological balance necessary for sustainable economic growth. However, the implementation of the 1995-2005 forest policy faced the following critical constraints: (a) increasing population pressure on land resources, and the inability of the natural resource sector to meet the increasing resource demand; (b) the inability of various users to take full responsibility of balancing supply and demand for forest resources; (c) inaccessibility to land and difficulties in securing extended tenure (to match the long-term benefits of investment in forest resource development) for private foresters; (d) poor marketing system for forest products; (e) inability to stimulate adequate private sector response to investment possibilities in forestry; (f) inadequate capacity of the institutional framework to sufficiently advance the sector; and (g) inadequate consideration of climate issues in the policy design. This National Drought Plan is designed to apply adequate remedial and protective measures in a systematic manner to sustain a sound forest resource base for meeting the specific needs of the local population and to highlight the impacts of ongoing climate change on forests, and the critical need to reduce deforestation and enhance ecosystem resilience, in the face of climate change.

2.1.3 The Environment Policy and Regulations

Environmental Acts, such as the **National Environmental Management Act** of 1994 focus on conservation, pollution control, and environmental impact studies, rather than incorporating any aspect related to climate change. In this regard, environmental management policy is based on sound partnership among the farming community, the private and public sectors in the effective implementation of the Gambia Environmental Action Plan (GEAP).

2.1.4 The Agriculture and Natural Resources Policy (2009-2015)

The **Agriculture and Natural Resources Policy** (2009-2015), which was revised in 2013 to integrate climate change issues systematically, including the highlighting risks to food and cash crops, as well as livestock, from future climate change effects, as well as negative impacts to natural (terrestrial and aquatic) ecosystems, with mangroves and grasslands being negatively affected. The National Drought Plan is aligned to this policy and is expected support the sustainable management of water system for effective response to climate and climate change.

2.1.5 The Fisheries Policy and Strategic Plan (2012 – 2015):

The Climate Change-Integrated **Fisheries Strategic Action Plan** (2012-2015) was reviewed in 2013 to place more emphasis on anticipated climatic impacts on fisheries and other aquatic systems, and to propose a number of adaptation response measures. Significantly, although women and female-headed households are the main work-force in agriculture and should be a key focus of "rural resilience" efforts, gender is not significantly mainstreamed into the existing ANR policy's sub-sector policies and strategies, even though in its discussion on cross-cutting issues the Policy does recognize a number of key constraints facing women: access to land and land rights; lack of collateral to access credit, limited access to formal markets, lack of market information and access to inputs, etc.

2.1.6 Water resources policies and regulations

Three new Draft Water Bills awaiting formal approval and enactment have been prepared which address The Gambia's water resources within the context of climate change. The **Water Act** will ensure protection and management of the nation's water resources, look to the needs of future generations and promote the efficient and sustainable use of the resource for the future, and enshrine the equal treatment of women, and public participation in decision-making. The OMVG Convention does not seem to apply to groundwater connected to the basin's surface waters and fails to incorporate substantive obligations related to harm prevention and equitable use. These issues will be discussed and remedied in the proposed National Drought Plan.

2.1.7 Tourism policy and regulations

The **Gambia Tourism Board Act** of makes no mention of any environmental responsibilities and is completely silent on climate change. Therefore, changes in Physical Planning regulations and NAWEC regulations would also apply to future building and construction works. The regulations do specify requirements pertaining to erosion control and drainage (Section 13) but only to "stabilize ground surfaces at the risk of wind, runoff or wave erosion", and to maintain major drainage channels "in conformity with public health regulations". No mention is made of climate proofing (whether related to sea-level rise, extreme weather events, flooding, etc.) and thus this proposed National Drought Plan includes issues related to climate change extreme events.

2.1.8 Health policy and regulations

The **National Health Policy** (2012-2020) had been reviewed to incorporate climate change issues. The potential health impacts of climate change such as vector-borne and zoonotic diseases (malaria, yellow fever, dengue, etc.), water-borne diseases (cholera, schistosomiasis, etc.) and weather-related morbidity and mortality (as a result of extreme weather events) are now integrated into policy. The updated **Health Sector Emergency Preparedness and Response Plan Related to All Hazards** (2017 - 2019) was reviewed in 2018 to address a number of climate related hazards as well as underlining the cross-sectoral cooperation in addressing health sector hazards (drought, floods, bush fires, windstorms, locust invasions, environmental degradation and epidemics) Many of these issues will be taken care of in the proposed National Drought Plan.

2.1.9 Education Policy and regulations

Education, at Basic, Secondary and Tertiary level falls under the Ministry of Basic and Secondary Education, and the Ministry of Higher Education, Research and Technology. The **Education Policy** (2016-2030) notes that (a) there is urgent need for young people to be equipped with the necessary knowledge, skills and attitudes to be able to address the challenges triggered by climate change resulting to global warming and sea level rise; coastal and marine degradation, loss of biodiversity, and issues of waste and waste management; and (b) considering the need to prepare the youth for adaptation to the effects of climate change, and to engage them with a view to a proactive, conscious and relevant response to the profound changes taking place on the West African coastline, the education sector will partner with the relevant stakeholders to push forward environmental education, including its integration in school curricula. This National Drought Plan prioritizes and supports some of these issues.

2.1.10 Disaster Management Policy and Regulations

The Strategic National Action Plan (2014-2017) – Strengthening Disaster Risk Reduction and Management in The Gambia specifically recognized the need to integrate climate change adaptation with disaster risk management, and is committed to develop risk assessment and risk modeling tools, including drawing on technical assistance from international partners (World Bank, ECOWAS, ISDR and the Africa Risk Capacity Agency and in close collaboration with the private sector and insurance industry) to develop innovative and sustainable strategies of disaster risk financing. Key areas for intervention in order to promote resilient development include the enforcement of DRR measures in land-use planning and building regulations and standards. This National Drought Plan will align to and support inclusive disaster management activities related to hydrological events, especially drought incidence and management.

2.1.11 Local government, land and physical planning policies and regulations

Building codes and regulations fall under the Ministry of Local Government and its Physical Planning Department, and are part of a series of measures requiring urgent action to underpin

climate resilience. Action to update and climate proof building standards, energy codes, etc., is being undertaken jointly between the Ministry of Local Government and The Gambia's Standards Bureau. However, work has only recently started on this and the process is still in its early stages. The process will need validation as well as integration into legal frameworks such as the Local Government Act and the Physical Planning and Control Act.

2.2 Existing Programmes Addressing Issues of Drought

2.2.1 National Action Plan to Combat Desertification, Land Degradation & Drought (NAP)

The National Action Programme (NAP) to combat desertification, land degradation & drought in The Gambia developed by the Ministry of Environment, Climate Change and Natural Resources (MECCNAR) in 2015 underscored the importance of Sustainable Land Management (SLM) and land degradation. It is perceived that the degradation of the land-based resources in The Gambia is a compounded economic, environmental, ecological and cultural problem that requires collective actions. In that context, and in an even broader sense, the process must be understood as a social problem in which land degradation and desertification are at the center of a triangular relationship between people, poverty and food security.

2.2.2 National Adaptation Plan of Action (NAPA)

The development of the National Adaptation Programme of Action on Climate Change (NAPA) the Gambia was developed in 2007 emphasizing the importance the state attaches to the threat from climate variability and climate change. The First National Communication of The Gambia to UNFCCC 2003, captured the potential impacts of climate change on the socio-economic sectors of the country are mostly negative and therefore the populations are vulnerable. The Government of The Gambia has recognized the need for action in containing the threat and has taken bold steps to this effect.

2.2.3 National Biodiversity Strategy Action Plan (NBSAP)

The Gambia has prepared this National Biodiversity Strategy and Action Plan (GBSAP) in 1998 to fulfill one of the key obligations under Article 6 of the Convention on Biological Diversity (CBD). The GBSAP sets out a strategy for action under the following main headings; forestry and forest biodiversity, fisheries and aquatic ecosystems; wildlife, wetlands, agricultural biodiversity, livestock, geology and water resources, policies and legislation, international agreements and social and cultural aspects of biodiversity. The Action Plan recognizes that much of biodiversity loss in The Gambia, as elsewhere, is due to economic policy distortions and the resultant poverty that encourage rapid over exploitation of biological resources rather than sustainable use. It also recognizes that slowing down the rate of biodiversity loss will require

policy and institutional reform as well as institutional strengthening for effective action in all the areas.

2.2.4 National Forestry Action Plan and Strategy (NFAP)

The new National Forestry Action Plan and Strategy (NFAP) developed in 2018 came into being after the 2001-2010 plan was reviewed and validated in 2018. The primary purpose of the plan is to provide practical guidance on the implementation of programmes of sustainable dry land forest management and rehabilitation. It provides a programme direction in sustainable dry land forest management to make the forest sector more biodiversity-friendly, and socially beneficial. It addresses the linkages between forestry, biodiversity, and poverty reduction, showing their complementarities in sustainable economic development.

2.3 Importance of National Drought Plan

- The NDP is a measure to reduce the risk and effects of drought in the Gambia.
- Learned about causes and pattern of drought in the Sahel region.
- To know drought nature and impacts
- Help protect livestock and environmental drought related disasters
- Help coordinate all activities towards drought mitigation

3. OVERVIEW OF DROUGHT IN THE COUNTRY

3.1 Historical Occurrences

The Gambia is part of the Sahelian Region of West Africa and shared the same climate pattern of the sub-region which differs from south to north. The Sahel has experienced three types of rainfall periods from 1950s to recent years. These periods are 1950s to 1968/69, 1970 to 1993 and from 1994 to recent years. The first period consist of persistent humid years (Figure 1 below) with positive rainfall (anomaly) indices with abundant precipitations throughout the period. The second period from 1970 to 1993 persistently consists of dry years (negative anomaly), which resulted in the droughts years of 1970s to 1993 in Sahel, the severity of which differs from year to year affecting people and livestock. The Gambia was not spared in the these droughts and low/erratic rainfalls, which has dropped the productivity of certain crops and led to changes in the cropping pattern and the introduction of new short cycle crop varieties in the in the late 1970s to early 1980s. The third period from 1994 to recent years is a period that neither continuous humid or dry years, but an alternation between the two. However, this alternation is largely attributed to the effects of climate change on the climate systems of the sub-region.

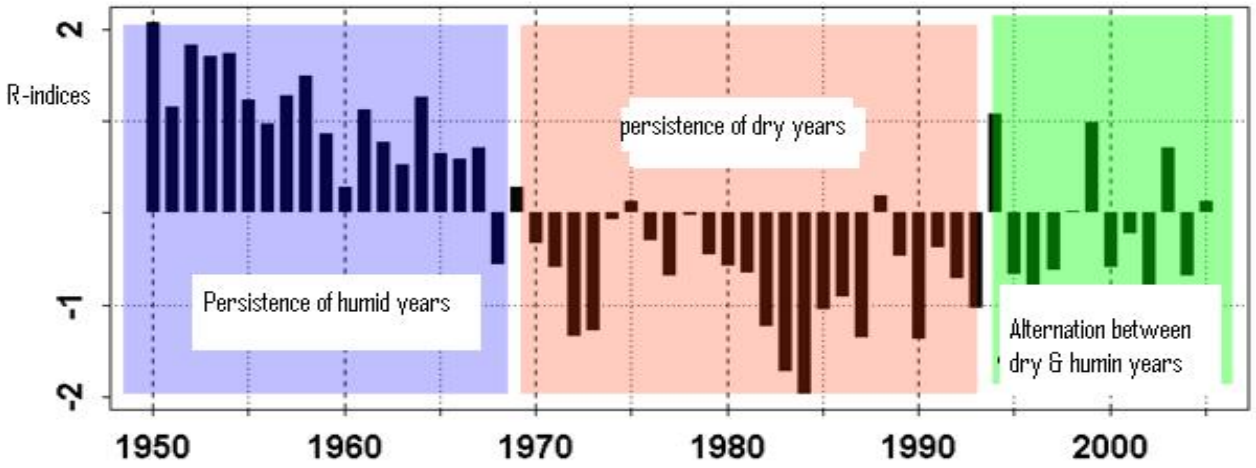


Figure 1: Evolution of rainfall (anomaly) indices in the Sahelian countries from 1950 to 2005
Source: AGRHYMET Regional Centres, Niamey, Niger.

Across these three periods the country has witnessed a gradual decline in annual rainfall averages (Figure 2a below) of 5.75mm of rainfall per year, amounting to a decline of about 368.0mm in 64 years as the influence of climate change gradually sets in with all its adverse impacts on the environment and its socio-economic activities. The decline with exceptional years of drought is markedly visible from the graph, from a maximum annual average of 1484.7mm to a low of 513.1mm in 2003 and further a bit above this value in 2002, with a repeat of the scenario in the 2011 Figure 2b below). Other droughts years were earlier in 1972, 1983-1985, 1990-1993, 1996-1998 and 2002. These years recorded average annual rainfall values of less that 600mm and were designated droughts years with severe impacts on the agricultural

production, livelihoods and overall economic performance of the country. The 1982 rainy season remains the worst drought year since the start of records in The Gambia.

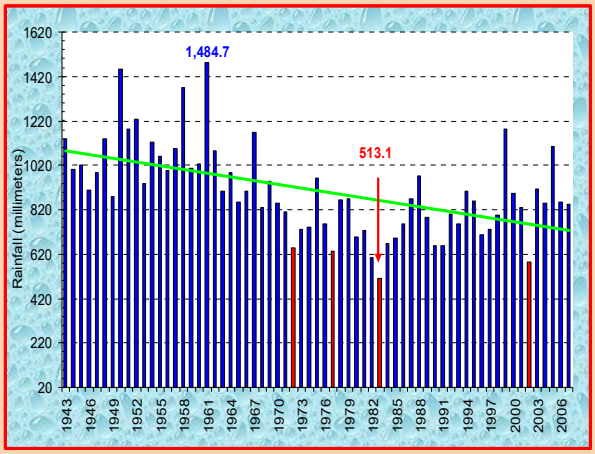


Figure 2a: Country average rainfall trend from 1943 to 2008
(Source: DWR 2016 (community Sensitization on CC)

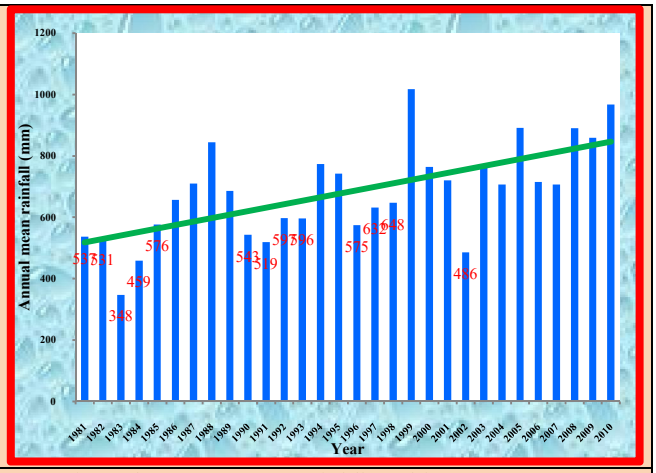


Figure 2b: Country average rainfall trend from 1981 to 2010
(Source: DWR 2016 (community Sensitization on CC)

Within the period of 1994 to date, The Gambia has experienced a number of alternation between humid years (above normal rainfall) adequate rains (normal rainfall) and low rainfall (below normal rainfall). During the low rainfall period the pattern became unpredictable and unreliable combined with early/late unset of rains, inadequate distribution of rains sometimes erratic in nature. The 2011 season was a near drought year due to its inadequacy and uneven distribution of rains affecting agricultural production leading to the Government declaring the year a crop failure year impacting seriously on the GDP growth and economic performance. Predicted long-term trends in drought and rainfall variability are reported for The Gambia, which suggests that The Gambia is highly vulnerable to loss and damage from climate change, particularly from climate extreme events such as droughts.

3.2 Understanding drought: Meteorological, Agricultural, Hydrological and Socioeconomic Drought

For simple understanding, drought is generally defined as an extended period; a season, a year, or several years of deficient precipitation compared to the statistical multi-year average for a region that results in water shortage for some activity, group, or environmental sector. Meanwhile, dozens of more specific drought definitions are used around the world according to the lack of rain over various time periods, or measured impacts such as reservoir levels or crop losses. Drought can be defined according to meteorological, agricultural, hydrological, and socio-economic criteria[1]. Usually drought indices are commonly used as proxies for monitoring water availability in an area. The indices which are used to define departures from normal conditions include (1) meteorological drought indices that identify periods with below-normal

[1] http://www.fao.org/docrep/017/aq191e/aq191e.pdf

precipitation and above-normal precipitation; (2) agricultural drought indices that define periods with dry soils resulting from below-average precipitation, intense but less frequent rain events, or above-normal evaporation, all of which lead to reduced crop production and plant growth; and (3) hydrological drought indices that define periods when river stream flow and water storage in aquifers, lakes, or reservoirs fall below long-term mean levels. In quantifying meteorological drought indices, precipitation is the primary variable and surface air temperature is the secondary factor; soil moisture content and stream flow data are the primary variables used in estimating the agricultural and hydrological drought indices, respectively (Mannocchi, F & Francesca, Todisco &Vergni, Lorenzo, 2004).

3.2.1 Meteorological drought

Meteorological drought is known when precipitation is compared to a long-term normal in terms of departures from the normal. In essence, Meteorological drought is defined usually comparing the precipitation of a precise place and moment to the average of precipitation of that place for a long period (normal). This is why the definition is specific to each region. Meteorological drought results in depletion of soil moisture that almost always has an impact on crop production. In consideration here, is only the objective factor of reduction of precipitation, not taking into account the effects of that reduction on water reservoirs, human needs or agriculture[2].

3.2.2 Agricultural Drought

Agricultural drought in short, when there is insufficient soil moisture to meet the needs of a particular crop at a particular time. Agricultural drought is typically evident after meteorological drought but before a hydrological drought. It occurs when there is not enough water available for a particular crop or crops to grow during a particular time within a region or country.

An agricultural drought is considered to have set in when the soil moisture availability to plants has dropped to such a level that it adversely affects the crop yield and hence agricultural profitability. In brief, the definition of agricultural drought is concerned with the soil moisture deficiency in relation to meteorological droughts and climatic factors and their impacts on agricultural production and economic profitability[3]. Agricultural drought is typically evident after meteorological drought (when rainfall decreases) but before a hydrological drought (when the level of rivers, lakes and reservoirs decreases)[4].

Furthermore, it is important to note that the effects of droughts are different in irrigated and non-irrigated agriculture. In the first one the impacts are usually lower as it depends on stocks of water (reservoirs), so in case of not having precipitations, these crops still get the water they need, in the second case, crops depend directly on water falling as precipitations, if these are

[2] http://klimat.czn.uj.edu.pl/enid/3__Drought_in_the_Mediterranean/-_causes___types_of_drought_184.html
[3] https://www.researchgate.net/publication/289389232_Agricultural_drought_Indices_definition_and_analysis
[4] http://klimat.czn.uj.edu.pl/enid/3__Drought_in_the_Mediterranean/_causes___types_of_drought_184.html

reduced, they don't get the water they need to survive[5]. This drought may not depend only in the amount of rainfall, but also on the correct use of that water. Imagine there is a period of low rainfall and also water is not used in the correct way for irrigation and other uses, then the problem becomes even bigger than it was before.

3.2.3 Hydrological Drought

Hydrological drought refers to when shortages/deficiencies of water resources: surface and subsurface water supplies occur, when for example; groundwater, reservoir, or stream levels are significantly reduced. This is considered the drinking water type of drought. Conditions for hydrologic drought are built over extended periods of time. It takes a longer time for reservoirs or streams to become depleted, which corresponds to longer replenishing periods[6].

3.2.4 Socioeconomic Drought

This of type drought occurs when human activities are affected by reduced precipitation and related water availability. This form of drought associates human activities with elements of meteorological, agricultural, and hydrological drought

3.3 Drought Impacts by Sector:

3.3.1 Agriculture

Drought impacts agricultural production and quality of agricultural product. The figure below (Figure 3) shows the proportion of households reporting drought impact of 2011 the North Bank Region of the Gambia. From the table, it is clear that most household's crops and livestock were severely affected by the drought pushing food prices very high in the region.

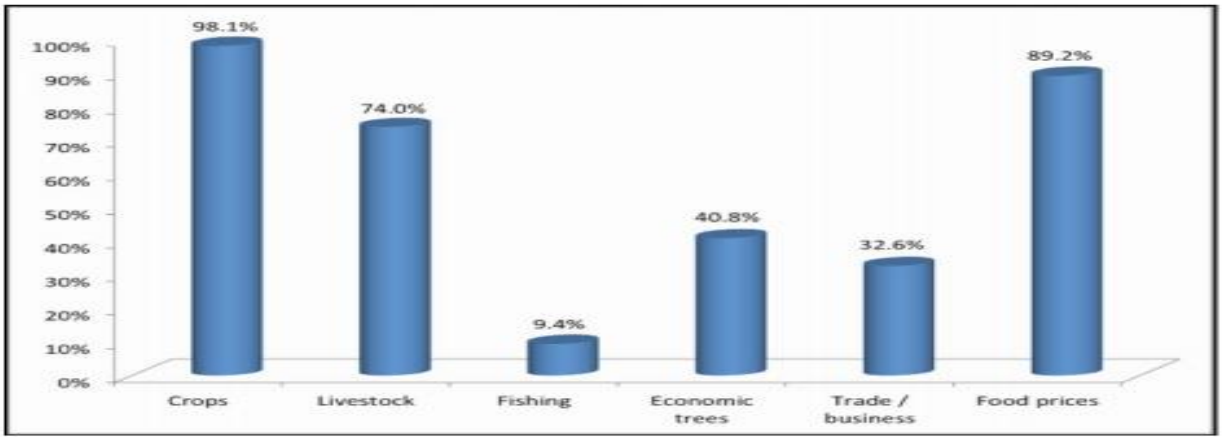


Figure 3: Proportion of households reporting different types of drought impacts
Source: The Gambia Loss and Damage questionnaire survey, July–August 2012.

[5] http://klimat.czn.uj.edu.pl/enid/3__Drought_in_the_Mediterranean/-_causes___types_of_drought_184.html
[6] https://articles.extension.org/pages/64791/what-is-hydrological-drought

Drought or substantial dry periods cause partial or total crop failures with repercussion on livelihoods tranquility and sedentarily settlement threatening the overall food securing situation of whole, community or country. Generally, an agricultural system that depends entirely on rainfall are the most hit in the event of drought. As the drought prolonged, irrigated agriculture also run into problem as surface and underground waters dwindles down. Drought in agriculture, cause lost of production, soil degradation and loss of its nutrients, abandonment of agricultural lands, migration of farmers, increased rural poverty and affects the overall national Gross Domestic Production of the county.

3.3.2 Livestock

Any drought in the Gambia can impact the Livestock sector in four areas, namely: fodder, rate of conception and calving, water availability, milk output and live weight. Fodder is the back born of pasture for livestock survival and development, which itself depends of rainfall in the Sahel region including the Gambia. Therefore any substantial variation in rainfall, either in frequency or intensity could significantly affect the availability of fodder. Hence, any fall in fodder availability due to low rainfall is the first main effect of drought on livestock production systems, to an extent, Low rainfall also causes a drop in the availability of drinking water, precluding the effective grazing of certain pastures[7].

Drought also impacts on animal rate of conception. For Example in a drought year, animals suffer both a lower rate of conception, due to a tardy and incomplete return to peak bodyweight during the rains on one hand, and higher rates of miscarriage and stillbirth in the subsequent period of pregnancy and calving in another hand, due to the high level of stress experienced by animals as the dry season proceeds.

Drought in one year usually lead to lower calving rates in the following year, this drop in the number of new calves within the herd is further aggravated by high mortality rates among young stock. Whilst, in normal years of rainfall, this trend is different usually with a highly seasonal calving pattern leading to most conceptions taking place in the mid to late rainy season (July to October) followed by calving in the late dry season.

Another impact of drought on livestock is milk output, which depends on fodder availability. Milk output usually falls as female access to fodder reduced and at certain level of this inaccessibility lactation stops completely. The fall in availability of milk does not only affects calf's nutritional status but also the consumption and nutritional levels of the herders and their families, who to greater extend relies on their animal milk for part of their food requirements and income.

[7] http://www.fao.org/wairdocs/ILRI/x5439E/x5439e02.html

Generally, in normal rainfall years, humans could often in tight competition with calves for available milk from female animals in the herd, whereas, a drought-induced milk shortage will intensify this rivalry.

The other aspect of livestock that could be affected by drought is animal live-weight, which could fall drastically as grazing becomes scarce, thus reducing the value of stock in the market as meat animals. This loss of weight also reduces animal strength resulting to less ability and value for transportation of goods and agricultural use, such as ploughing and drawing of water for domestic and agricultural uses.

3.3.3 Water Resources

Drought has serious implications for the water resources sector. Both surface and underground water and water quality are affected in any drought period, especially a prolonged drought. Surface water bodies include rivers and lakes/ponds which are replenish annually by annual rainfall. In the national context, most lakes or ponds vary in size and differ in water holding capacity. Generally, they are all temporal in nature, and hardly most last for the length (8 months) of the dry season in The Gambia. The rate of replenishment of surface water bodies is affected if there is any drop or reduction of rainfall or a year of drought.

Runoff water the vehicle of this replenishment of water bodies, depends on the annual quantity and frequency of rainfall, thus any drought or reduced rainfall will result to reduced or total cessation of runoff water. This will in turn led to quick drying up of lakes/ponds reduce river flow, with the consequence of less water for tidal irrigation in the central parts of the country and animal drinking water country wide. The reduced stream/river flow will result to rapid upstream movement of the saline front allowing salt intrusion into the fields adjacent to the main river and its tributaries, some of which are agricultural fields.

Likewise, underground water resources in the country are constituted of different aquifer depths, depending on the area of the country. Generally, aquifer recharge comes from rainfall and at times from streams and rivers. Drought or reduced rainfall reduces aquifer re-charge rate restricting the availability of underground water resulting to gradual fall in ground water supply. Gradual fall due from drought or continued reduction in rainfall affect both urban and rural domestic water supply and also irrigation in gardens as all the sources of domestic water supply in country come from underground aquifers. Prolong reduction of rainfall could result to underground salt intrusion, particularly areas close to the ocean as aquifer re-charge falls due to reduction in rainfall or drought.

Water quality is also affected by drought, for instance, hydrological extreme events, such as droughts affect the runoff generation and confluence mechanism of any basin with a potential of changing the pollutants transformation and the dilution capacity of water bodies.

During dry periods as runoff when ceased completely, domestic refuses, wastes and non-point source contaminants alike are piled up in the earth's surface and soil. When the rain falls again ending the dry period, these contaminants join the receiving water body along with runoffs, thus affecting its water quality. In another, the dry–wet alternation from drought to rainfall will promote the decomposition of the organic matters in soil and increase the load of nutrients in water, which lead to a rapid deterioration of surface water quality in a short time.

Dust, dry wastes and leaves emanating from dry soils and it's the surrounding environment carried by the wind affect the water quality of surface water bodies during droughts or dry periods,

3.3.4 Socio-economic

The socio-economic impact of drought has a pretty large ramification on society. These impacts ranged from food crises, malnutrition, famine, migration, poverty, depression and deaths. The drought brings along crop failure which in turn causes food crisiswhich has number of social and economic ramifications.

The malnutrition affects people's health and wellbeing and safety besides inviting conflicts on the use of water resources. The high dust molecules density in the atmosphere due to prolonged drought or dry period may finally affect the people's respiratory system and may create allergy. The dried condition may give more space for forest fire, which threaten the people's life living in the forests and forest fringes. The anticipation and depression about the loss of economy due to drought may further create conflicts and disturb the peace of mind (Saxon, 2017).

As food becomes scared migration of people sets in from village to towns and cities (rural – urban migration) in search of livelihood, which further aggravate the problems of employment and social fabric. Drought can also increase poverty particularly rural communities with death of animals due to water and fodder scarcity.

4. DROUGHT MONITORING, FORECASTING AND IMPACT ASSESSMENT

4.1 Drought Indices

Currently there are no pre-set drought indices in the country. Meanwhile the normality of rainfall is used as a measure to determine looming drought or low rainfall. The normality is divided into three: Normal rainfall, Below normal rainfall and Above normal rainfall.

For this plan the following indices will be used at Regional level:

1. At the end of August if total rainfall in each region is less than 30% of the normal for that region, a drought situation is looming;
2. At the end of August if total rainfall in each region is between 30% and 40% of the normal for that region, a low rainfall situation is looming;
3. At the end of August if total rainfall in each region is 50% of the normal for that region, there will be near normal rainfall;
4. At the end of August if total rainfall in each region is 60% and above of the normal for that region, abundant rainfall is expected;

4.2Current Monitoring, Forecasting and data collection

Currently, the monitoring systems in the country are not centralized, meanwhile, individual institutions and Agencies had their own monitoring system using different kind of data and information to run the system. These institutions are: World Food Programme (WFP), Department of Water Resources (DWR), Service Planning Unit (SPU) of Ministry of Agriculture, National Nutrition Agency (NaNA), Food and Agriculture Organization (FAO) and Department of Agriculture (DOA).

There isn't a known existing centralized monitoring system specifically for drought in the country, however, there exist a working collaboration between these institutions, whereby in the event of a looming drought/crop failure due to erratic rains, all these institutions will be call under the coordination of the Ministry of Agriculture to provide data and information to monitor the looming situation and advice Government appropriately. At times, WFP and the Ministry of Agriculture in collaboration with other relevant institutions (DWR, PSU, National Disaster Management Agency [NDMA] FAO) will organize a joint assessment of the progress agricultural season with the objective of advising Government on the overall situation of the season and prevailing long term and short-term food security situation.

The Agriculture Stress Index System (ASIS) developed by Global Information and Early Warning System (GIEWS) and Climate and Environment Division (CBC) of FAO can also be use to monitoring of drought in the country. It can detect agricultural areas with a high likelihood of drought and support the vegetation monitoring activities of FAO-GIEWS

The only available forecast used in the country is the Seasonal Outlook that is produced every year in June which covers the months of July, August and September (JAS). It is prepared by experts from the West African region. The outlook also includes in it the on-set and cessation of the rainy season.

4.3 Drought severity in all relevant sectors

The Agriculture and Natural Resources Sectors are the relevant sectors that receive the most severe brunt of drought of crop failure. These sectors are Agriculture, Livestock, Water Resources, Wildlife, Forestry and Health.

The severity on some sectors is direct while it is indirect on other sector. On Agriculture, Water Resources, Livestock and Wildlife the severity is direct as they are impacted directly with water scarcity. About 70% of the rural population is employed in the Agriculture sector any drought more than half of the country is affected as the overall economy performance is affected. Health and Forestry the severity is indirect. For health is the repercussion of drought such as malnutrition, illnesses and deaths, while for the forestry is deforestation, with failure of crops, the forest is last resort for the rural community leading to rapid deforestation.

4.4 A Drought Impact Assessment Methodology

Several methodologies do exist for drought impact assessment, in the country the following methodologies will be used to assess drought/low rainfall:

1. The severity of the drought at National and Regional Levels;
2. The population affected (impact across gender)
3. The sector most severely affected
4. How livelihoods are affected
5. Short-term and long-term food security situation
6. The overall economic performance (GDP situation)

Multi-sectoral Team from sectors that are severely impacted by drought plus UN Agencies will be set. The Team will use these methodologies above to assess the impact of drought in the country and provide a report to Government for further action.

The 6 items presented in the text above will be assessed at regular intervals to determine aggregate impacts and also use the outputs as risk ranking analysis and classification, and monitoring tool.

5. DROUGHT RISK AND VULNERABILITY

5.1 The drought Risk and Vulnerability Assessment and GIS Mapping

Drought risk is a combined effect of drought hazard (likelihood) and drought consequence (vulnerability). Drought hazard is determined by frequency, duration and severity of droughts. Drought impact on various ecosystems and economy depends on the vulnerability of the affected system (Global Water Partnership).

Vulnerability of any sector to drought is generally term as the degree to which that sector is likely to experience harm due to drought stress. Example for Agriculture, when drought occurs, vulnerability of crops depends on several parameters, the most important ones being the ability of the certain croptypes to adapt to drought stress and the environment of its growth (soil, climate, available soil water) (Global Water Partnership).

Considering the size of the country, the vulnerability (Table 1 below) looks at sectoral approach and only hazards connected to rainfall are considered. However, some administrative regions are more vulnerable than others to droughts or insufficient rains due to ecological and socioeconomic factors as shown in the map below (Figure 4).

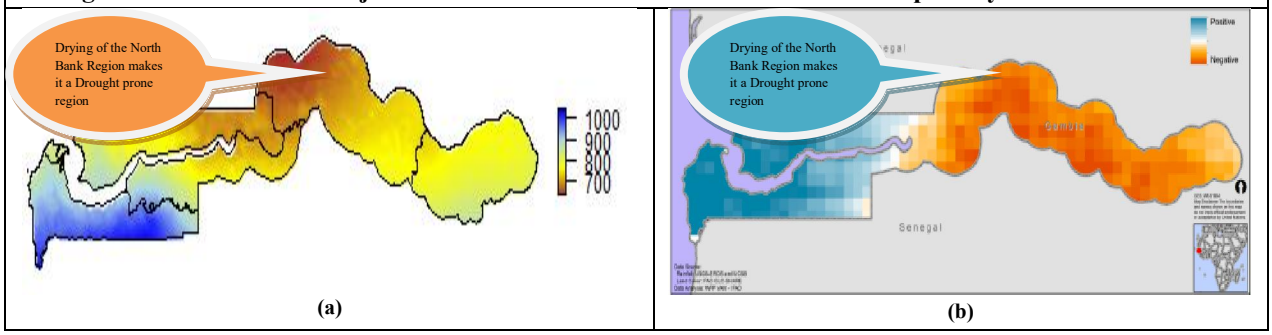
Table 1: Vulnerability of key sectors to drought hazards

Hazard	Sector	Vulnerability level	Remarks
Insufficient rainfall	**Agriculture**	medium	The country's Agriculture is rainfed, hence the sector performance and productivity is highly dependent on availability of rainfall making it sensitive and vulnerable to any shortfall in rainfall
Long dry spells		Medium	
Drought		High	
Insufficient rainfall	**Water Resources**	Medium	The country's water resources include the river and its tributaries, swamps and groundwater. A permanent area of the river is salt water, the distance from the mouth vary in the season; 270 km in the dry to 50km in pick of the rainy season. Seasonal rainfall is the regulator of this saline front movement, hence any drought or prolonged insufficient rainfall will see the saline front moving further upstream affecting fresh water availability.
Long dry spells		Low	
Drought		High	
Insufficient rainfall	**Livestock**	Medium	Apart from crop agriculture, Livestock is another sector that is seriously affected by any shortfall in seasonal rainfall due to its dependent on rainfed pasture. During the 2011rainfall deficiency, not only crops were affected some herders also lost their cattle due to hunger and diseases.
Long dry spells		Low	
Drought		High	
Insufficient rainfall	**The Economy**	Low	The country's economic performance is connected to seasonal agricultural productivity. In any season with unfavourable agricultural productivity see the GDP contracting as was the case in the 2011.
Long dry spells		Low	
Drought		High	

Insufficient rainfall	**Wildlife**	medium	Just like the Livestock, the survival of wildlife depend on good fauna and flora, in the case of the Gambia apart from river ecosystem, the rest of fauna and flora depend on rainfall for good functioning, insufficient rainfall or drought will lead to degradation of the fauna and flora affecting ability to sustain the wildlife
Long dry spells		low	
Drought		High	
Insufficient rainfall	Health	Low	Health is affected by the health repercussions of drought such as malnutrition, famine, illnesses and deaths which will put extra pressure on the national Health services, which has limited resistance to withstand such increased pressures.
Long dry spells		Low	
Drought		High	

Due to geophysical conditions, climatic extremes, and high degrees of exposure and vulnerability, The Gambia is a highly disaster-prone country. One of the major hazards affecting the country is **Drought.** According to the Detailed Post Harvest Assessment in 2011, The Gambia was affected by drought due to late, unevenly distributed and erratic rainfall during the rainy season, with an overall deficit of 10% below normal and 37% below 2010 levels. Particularly affected was most of the North Bank Region (Figure 4) with average rainfall being recorded at over 76% below normal in May-June and over 35% below normal in the period of July to October as well as Lower River Region at 82% and 41% below normal.

Figure 4: Current and Projected Rainfall of The Gambia shows decrease especially in the North Bank



5.2 Drought Risk Areas in Various Administrative areas

The country is very small (11,295 square kilometers) and any drought will virtually affect the whole country. However, the northern part of the country is having a higher risk to drought due to its annual rainfall records which are always low compared to the southern part in low rainfall year and the fact that most of its forest is deforested and the lands degraded. The region is in two administrative areas, the North Bank Region and part of the Central River North. Most of the populations are farmers who depend on rainfed agriculture for food and income.

Climate change is gradually altering average temperature, sea level, and the timing and amount of rainfall, as well as contributing to more frequent, severe and unpredictable droughts. Projected rainfall amounts in the Gambia by 2100 will be less than 600mm country wide (Figure 5). Climate change acts as a magnifier of existing climate-related hazards, which for The Gambia

imply severe or more unpredictable return period of drought and aridity. Droughts are rare events but are potentially highly destructive.

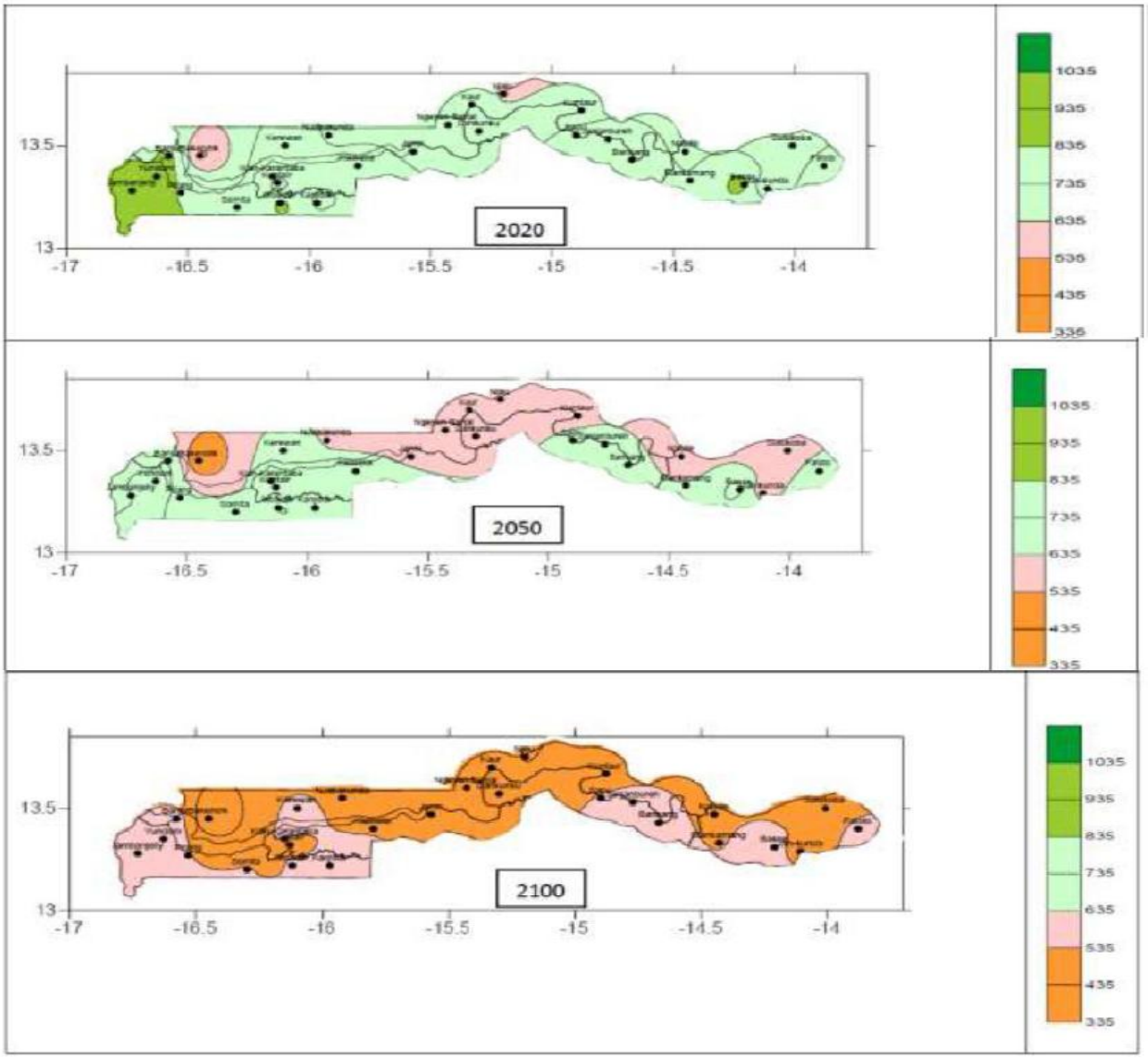


Figure 5: Climate Change impacts include less that 600mm of rainfall to be received in The Gambia by 2100[8]

The larger overall drying trend of the last 40 years has had a profound impact on water resources: dried up springs and streams and falling water tables, contraction of seasonally-flooded swamps and enhanced saline intrusion. The Saline Front has been observed to move far inland, penetrating what is conventionally known as a perennially freshwater area (Figure 6). Under climate change, the Salt Water Front is projected to move further upstream by about 37 kilometers by 2100. Since the 1960s, large areas of freshwater swamps in Western Gambia have been replaced by saltpans or salt-water marshes as a result of reduced fresh water inflow from

[8] *Courtesy of Fatou Sima, Head of the Climate Division of the Department of Water Resources*

storm run-off, preventing rice production in North Bank Region (NBR) and Western parts of Central River Region (CRR). Mean sea level has increased by 0.19 cm from 1901 to 2010, mainly due to ocean thermal expansion and glacial melting, though the effects on agriculture in The Gambia have not been discerned. Changes in the vegetation cover are evident in the North Bank Region and northern Central River Region (Figure 7).

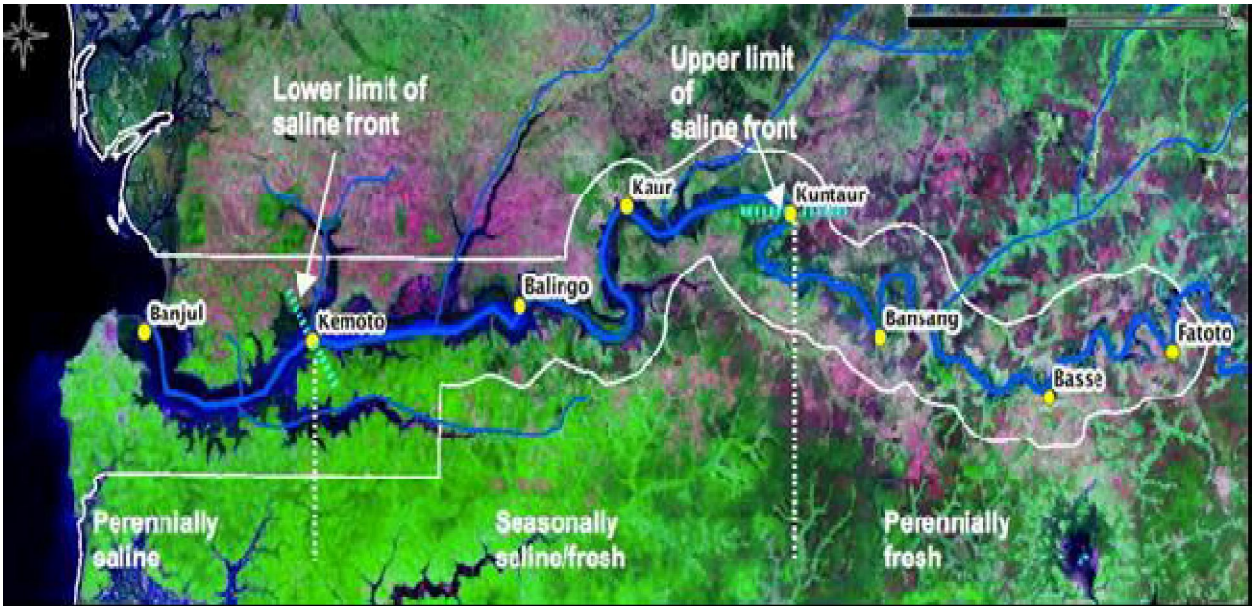


Figure 6: Saline water intrusion upstream due to reduced freshwater recharge to the River and salt water flow from the Ocean into the Estuary of the River due to rising sea level.

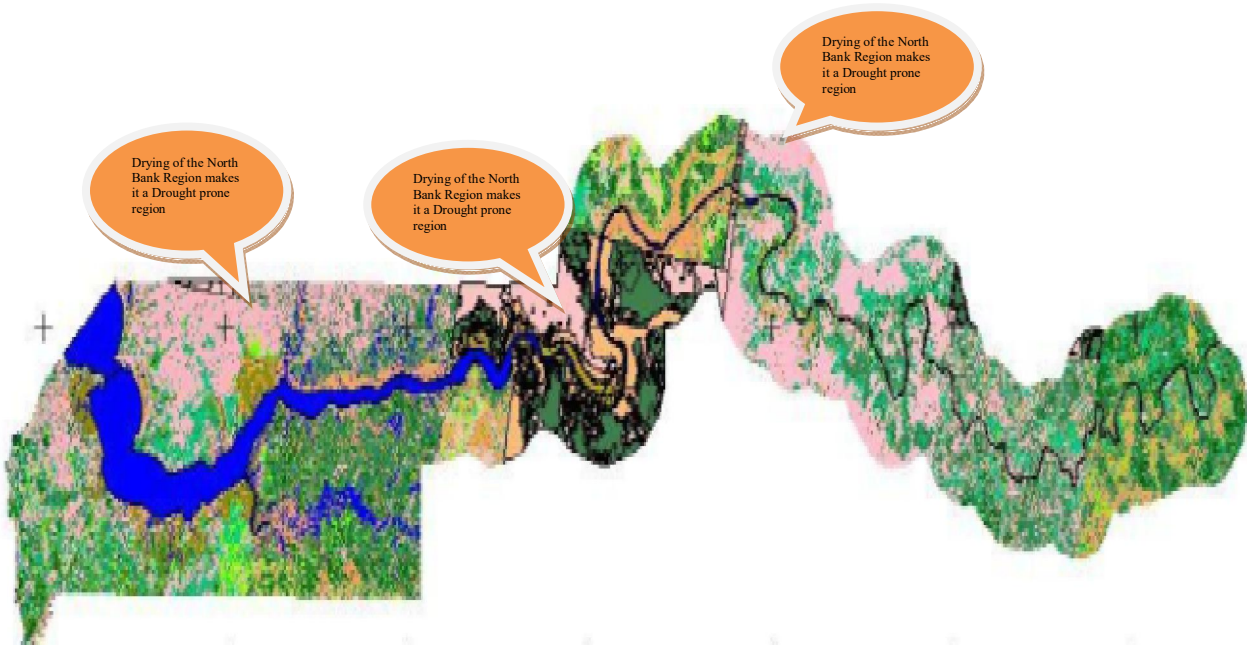


Figure 7: Vegetation Map of The Gambia

6. DROUGHT COMMUNICATION AND RESPONSE ACTIONS

Communication of information in general is a prerequisite for efficient and effective action, poverty eradication and socio-economic development. For effective response to drought incidence, the Government of The Gambia must be committed to improving the timely availability of relevant information to the population on drought at all stages (planning, incidence, response, monitoring).In order to mitigate the effects of drought, it is important that the general population, especially water managers and farmers, are aware of risks that they are exposed to. They can contribute to reduction of losses by choosing less sensitive crops in case the drought is developing already.

The existing Communication Strategy must be improved to allow sectors to clarify their specific and thematic messages that should be communicated to different target audiences. Sector (Water, Agriculture, Health, etc) specific strategies and crafting, packaging and dissemination of messages and themes (e.g., Table 2) must me clearly adopted.

6.1 Communication Goal and Objectives

The ultimate goal of the Communication Strategy is improved awareness and understanding on the management of droughts especially on water issues and initiatives in The Gambia for effective contribution to poverty eradication and climate change adaptation through (a) ensuring local authorities receive prompt provincial updates on drought levels; (b) raising awareness about the status of water supply throughout the production season; (c) increasing knowledge on the drought level alert system and potential implications; and (d) identifying mechanisms for effective communication regarding drought status

6.1.1 Objective 1

Maintain a level of drought awareness for water resource users within the beneficiaries by providing technical information regarding water supply and low flow demands. This will be done through the implementation of risk ranking analysis and classification. Educated decisions are made as drought awareness assessments and information is provided to clients, who can then justify modifying their standard operations and can subsequently implement restriction recommendations. Part of the authorization process is the communication of assigned drought indicators and levels; these will be communicated prior to issuance of authorization documents.

6.1.2 Objective 2

Provide a conduit to provide technical information for regional and national level stakeholders regarding the water supply for local communities and facilitate the return of this information back to governing agencies. Educated decisions are prepared and implemented, allowing management practices to adapt when data and information is shared across ministries, agencies, and other user groups. Encourage and enable the continued participation of Drought Response

Working Group to network and develop decision making strategies with other local users, water interest groups and stakeholders.

6.1.3 Objective 3

Communicate water conservation requirements and the potential consequences of failing to meet these target requirements to the public. Explain the importance of mitigating drought conditions and how the public's continued involvement will aid in maintaining critical ecosystem functions, and therefore build socio-economic impacts.

6.1.4 Objective 4

Define measurable targets in response to each drought level. These targets indicate to water users the magnitude to which their water use will be affected. In extreme situations of drought, water use may be severely curtailed by government-issued orders. It is also important to communicate what the public may experience if water is not conserved. In times of drought, this objective becomes very time sensitive, especially if the drought is a prolonged one. The strategy is to complete the discussion at the permitting and renewal stage of water authorizations for prospective water users.

Some communication strategies have been identified for recognizing, mitigating, and implementing drought response objectives. Among them are drought response levels, early warning of potential for drought later in the year, information and data collection for dissemination, and identifying communication roles for local authorities and local drought management teams.

A good internal communications plan will involve all relevant stakeholders, facilitate effective communications, and organize response protocols. It should also address all roles and lines of communication and/or responsibility. Last, the plan should clearly outline how information will flow across and through the organization and to its external stakeholders.

There should be a team of stakeholders engaged on outreach services for drought communication. They must ensure regular status updates which may be weekly in a bid to share results and outcomes with internal stakeholders and neighbours. There should be requests for action clear by specifying who/what/by when. There should be regular briefing of elected officials via individual or small group meetings.

Staff level: The team should determine talking points and core messages update utility website and verify all links. There should clear concise communication and messaging to field staff. Use multiple outreach methods to ensure everyone knows what stage you're in, examples: leadership Q&A sessions throughout the organization, electronic messaging boards, central clearinghouse for messages, email becomes a record – way to track back, coordinate with HR to include

utility/municipal talking points in employee newsletter, and other organization-wide announcements.

6.2 Drought levels to be included in the Communication

The Drought Levels (Table 2) are based on scientific indicators including seasonal runoff for river basins, precipitation, and stream flow. The Drought Levels are used to streamline communications on drought conditions and risk across the country as follows.

- **Level 1: Normal (Green):** Conditions are normal and there is sufficient water to support ecosystem and socio-economic needs. Emphasis is focused on preparedness and taking action in advance of droughts in order to increase readiness of water users and communities when it inevitably occurs.
- **Level 2: Dry (Yellow**): Conditions are dry and first indications of potential water supply shortages are recognized. Emphasis is on stewardship and voluntary conservation through education, communication and planning.
- **Level 3: Very Dry (Orange**): Conditions are becoming very dry. Potentially serious ecosystem or socio-economic impacts are possible and minor impacts may already be occurring. Emphasis continues to be on voluntary conservation but increasing use of watering restrictions may be imposed by water service providers.
- **Level 4: Extremely Dry (Red):** Conditions are extremely dry and there is insufficient supply to meet community or ecosystem needs. Progressively more severe and widespread socioeconomic impacts are expected. Voluntary measures and increasing use of restrictions will continue but may be augmented by regulatory responses by the Government including use of authorities provided under the National Water Resources Act and other supporting legislation such the Local Government Act.

Table 2: Summary of the different levels of drought conditions

Level	Conditions	Significance	Objective	Target
1 (Green)	Normal Conditions	There is sufficient water to meet human and ecosystem needs	Preparedness	Ongoing reductions in community water use
2 (Yellow)	Dry Conditions	First indications of a potential water supply problem	Voluntary conservation	Minimum 10% reduction
3 (Orange)	Very Dry Conditions	Potentially serious ecosystem or socioeconomic impacts are possible	Voluntary conservation and restrictions	Minimum additional 20% reduction to a minimum total of 30%
4 (Red)	Extremely Dry Conditions	Water supply insufficient to meet socio-economic and ecosystem needs	Voluntary conservation, restrictions and regulatory response	Maximum reduction
Loss of Supply		Potential loss of a community's potable or fire fighting supply	Emergency response	Ensure health and safety

6.3 Modes of Communication

6.3.1 Peer to Peer Communication

On at least a semi-annual basis, staff should engage in networking opportunities with their peers at interconnected utilities. At a minimum, the opportunity for extension field workers and farmers to interact can help improve understanding and working relationships as well as help ease potentially stressful future crisis situations over the long term.

6.3.2 Regional contact list

There should be two key contacts regionally which must be updated as needed by the list manager. The list can be hosted on cloud storage of the Ministry of Water Resources site so it is accessible as needed by all members. The list should be reviewed annually to ensure it stays updated. This list should as well include network of email contacts of all members.

6.3.3 Regional conference call or face-to-face Meetings

During times of drought conditions, the assigned taskforce should meet regularly face to-face to stay up to date on conditions and actions in the region as well as to collaborate on any regionally appropriate responses. In addition, regional conference calls could be scheduled between face-to-face meetings to provide an easy way to touch base with peer states.

6.4 Declaration of Drought

Drought can appear quickly or slowly, last for a season or many years, and can occur locally, regionally, or national-wide. Furthermore, a drought does not usually have a clearly defined beginning or end and is difficult to predict. It is important to ensure that the official drought declaration and corresponding drought stage designation occurs in a timely manner. If a drought is declared too late or actions are not take nearly enough to reduce water use, supplies can be severely depleted and strict water restrictions and economic impacts may be required that could have been avoided. Conversely, premature drought declarations can result in unnecessary mandatory water restrictions and associated impacts, while customers can lose confidence in the declaration. Drought declarations are further complicated by the unpredictability of drought and storm events. Droughts may extend over multiple years which could result in response targets greater than what are provided in Table 3. The declaration of a drought and corresponding drought stage will be a real-time decision using the drought trigger guidelines in Table 3.

The drought stage may also be de-escalated (e.g. changed from the critical to the warning stage) and/or the drought declaration may be terminated if storm events or other hydrologic conditions sufficiently reduce stress on the community's water supplies. This decision will be based on drought monitoring data, the WSI, and the historical experience and professional judgment of the staff managing the community's water supplies.

The Government of the Gambia has prioritized the development of more effective disaster risk management policies (see Section 2), which include the National Disaster Management Act and Policy in 2008 which led to the establishment of the National Disaster Governing Council under the Office of the Vice President and its Secretariat the National Disaster Management Agency (NDMA) that same year. The Act emphasizes the importance of developing effective strategies to address disaster risk management. The National Disaster Management Strategic Action Plan further sets out the priorities for implementing the Act and the Policy.

The National Disaster Management Agency, in collaboration with other technical institutions (Agriculture, Environment, Fisheries, Forestry, Parks and Wildlife and Water Resources), provide relevant information for the assessment of incidence and termination of droughts. There is no one data source or approach for this assessment. For the National Water and Electricity Corporation and the Rural Water Supply Division of the Department of Water Resources, the following approach can be adopted and used to assess the status of demand and supply.

A Water Supply Index (WSI), based on a community's supply versus demand is adopted for this drought management plan. It is a running index to define thresholds for the drought stages. The WSI is calculated as follows:

$$WSI = Supply/Demand = (Deep\ groundwater + Alluvial\ wells + Surface\ water + Water\ Transfer\ Schemes)/Maximum\ daily\ demand$$

Maximum daily demand is used as the demand metric because it accounts for the highest possible water use required to meet the community's needs on a regular basis. It is required to use the averaged daily demand of a village, or city, administrative region and a nation for a number of years and the projected maximum daily demand. Demand statistics provide the water requirements of human and animal populations; sectoral activities (agriculture, energy, etc) of the economy; etc. These data are available at national, sub-national and sectoral levels and can always be interpolated or extrapolated. It is assumed that maximum daily demands will be met via flexibility in day-to-day operations, though demands always vary seasonally and according to population changes/growth. Supply data includes supplies from deep and shallow boreholes; wells; rivers, streams, lakes and artificial reservoirs; and any water transfer schemes and agreements entered with the country.

The community monitors the WSI in real time and uses the seven-day rolling average of the continuously-calculated WSI as the basis for a drought declaration. The rolling average is used to smooth the variations in the WSI calculation, so that day-to-day fluctuations in the WSI do not unnecessarily trigger a drought declaration.

The WSI is useful for evaluating a community's (village, district, nation) capability to meet demands, given direct (e.g. groundwater) and indirect water resources available. Data and information is obtainable from the National Meteorological and Hydrological Services, the Department of Water Resources, results of studies such as the National Water Resources Assessment and from International Data Bases (UN, World Bank, UNEP, etc. As daily supply and demand fluctuates, the community will use both quantitative (WSI) and qualitative (professional judgment) guideposts to determine when to trigger a drought stage. In general, as long as the WSI is above 1.1, the community may not need to enact water savings or other such measures. Once the WSI drops below the trigger point guidelines shown in Table 3 and community staff observe the WSI trend to be stagnant and hence not improving (i.e. the trajectory of the line is either flat or going down), an appropriate drought stage shall be called.

Table 3: Drought Stages, Trigger Point Guidelines and Response Targets

Drought Trigger Point Guidelines			
Drought Stage	**WSI**	**Response Targets[1]**	**Key Restrictions**
Advisory	1.09 to 1.05	10% water savings	Voluntary water use reductions
Watch	1.04 to 1.00	25% water savings	Outdoor watering limited to 2 times per week
Warning	0.99 to 0.95	40% water savings	Outdoor watering limited to 1 time per week
Emergency	0.94 to 0.90	50% water savings	All outdoor watering/irrigation banned
Critical/Crisis	<0.90	60+% water savings	All outdoor watering/irrigation banned, plus some indoor water use restrictions

1 Percentage water savings is measured as the most recent month or months of total retail water sales divided by the retail water sales used inthe original WSI calculation.

From Table 3 above:

- A WSI of 1.09 to 1.05 is the quantitative trigger to the Advisory Drought Stage.In "Advisory", supply still exceeds demand, and the community would begin to take measures (outlined in Section 7) to reduce demand by 10%.
- A WSI of 1.04 to 1.00 is the quantitative trigger to the Watch Drought Stage and means that supply is nearly equal to demand. In this stage, the Town would continue measures started in the Advisory stage and begin additional measures with the goal of reducing demand by 25%.
- A WSI of 0.99 to 0.95 is the quantitative trigger to the Warning Drought Stage and means that supply is now less than demand, by 1% to 5%. In this stage, the Town would continue measures started in the Advisory and Watch stages and begin additional measures with the goal of reducing demand by about 40%. At the Town's discretion, measures to increase supply may also be considered.
- A WSI of 0.90 to 0.94 is the quantitative trigger to the Emergency Drought Stage and means that supply is up to 10% less than demand. In this stage, the Town would continue measures started in the Advisory, Watch, and Warning stages and begin additional measures with the goal of reducing demand by about 50%. Measures to increase supply will also be considered.

- A WSI of less than 0.90 triggers the Critical/Crisis Drought Stage, and means that supply is less than 90% of demand. In this stage, the Town would take all available measures to minimize demand while actively seeking to obtain supplemental supplies, with the goal of bringing the WSI above 1.0. Once supply equals demand, water conservation measures can remain in place until the WSI is back above 1.1 and the drought stage can be lifted.

The following are some approaches for communication of drought information relevant to water according to the prevailing Drought Level. These levels are valid in West Africa, as the climate outlook and seasonal outlook are provided in these categories.

Level 1 - Normal

- Communicate predictions from scientific models of likelihood of potential for low rain conditions (hydrological drought)
- Issue information bulletin.

Level 2 – Dry

- Issue information bulletins to local governing agencies
- Communicate with key stakeholders in impacted local authorities and specific farmers groups
- Where appropriate, advise agricultural producers to take early action such as filling reservoirs and filling soil profiles with fresh water if available
- Use direct and indirect communication to request water licensees to voluntarily work together, conserve, share water and consider in-stream needs

Level 3 – Very Dry

- Intensify communication efforts as appropriate based on current conditions
- Continue to issue local media releases and/or targeted advertising to advise of watering restrictions, encourage conservation, provide updates on local water supply status and forecast future conditions specific to the community
- Provide regular direct updates to local government and water suppliers
- Communicate with First Nations, industry and stewardship groups, major licensees and other key stakeholders in impacted geographic region
- Advise high volume water licensees (or all licensees on high-risk streams) directly of conditions and request that they implement voluntary conservation measures

Level 4 – Extremely Dry

- Increase frequency of communication from all levels of government and water suppliers with all water users through media, advertising, internet, email updates and other channels
- Continue to issue information bulletins to local governments, water suppliers, First Nations, industry and stewardship groups, major licensees and other key stakeholders in impacted geographic regions
- Water Sustainability Act orders

6.5 Communication and Coordination Guidelines

An effective disaster management Forum exists at the policy level under the Office of and chaired by the Vice President of the Republic. There is need for supervision at different levels of the state structure. The national supervisory body must be supplemented by home Member State legal entities. The supervisors acknowledge and are fully aware that the responsibility of exercising supplementary supervision will, initially, remain with the competent authorities of the Member States in which the drought issues has received official authorization.

6.6 Drought Response Actions

6.6.1 Declaration of Drought Conditions

The National Disaster Management Agency has the authority to manage disasters and emergencies of sub-national, national and international importance.

For disasters related to droughts the following goals are relevant:

- Define the NDMA's actions and strategy in responding to drought related emergencies that exceed the capacity of the decentralized structures (districts, councils, wards, villages, etc) at the Administrative Regions and Municipalities;
- Promote NDMA's compliance with the legal requirements and responsibilities in responding to drought emergencies;
- Establish a coordinated response by allowing the use of resources, as well as intra and inter-sectoral dialogue to ensure a timely, efficient and effective response;
- Adopt the Emergency Call Centre of NDMA as the operations command system and to manage and coordinate a response;
- Identify the roles and responsibilities of the different national and sub-national organization in terms of interaction with the media during a drought emergency;
- Establish and promote the use of common protocols and procedures for responding to drought and related emergencies.

Table 4. Showing a drought communication plan

Time	Activities	Person Responsible
1. When the state anticipates change in drought	• conference call or face-to-face meeting is set up to discuss status and next steps	○ Taskforce
2. When the state adopts change in drought	• Staff prepare a draft news release, seeking input and feedback from taskforce members for coordinated messaging • Staff update their websites as needed • Regional website information and links are verified • Taskforce prepares regional talking points and frequently ask questions and documents	○ Staff from ministry of water resources ○ Regional Directors for Agriculture ○ Taskforce members
3. After taskforce convene to review news release, talking points and frequently asked questions	• Distribute news release to local media outlets • Distribute news release to state & federal agencies • Local utilities conduct outreach to water customers	○ News media outlets ○ Local staff ○ Taskforce

7. DROUGHT MITIGATION AND PREPAREDNESS

With increasing vulnerability to drought is remarked globally, particularly in the Sub-Saharan Region and with concern on climate change also increasing, a greater attention has been directed to reducing risks associated with drought occurrences through the introduction of policies and plans to improve operational capabilities of climate and water supply/resources monitoring, building institutional capacities and laying mitigation measures that are aimed at reducing the impacts of drought.

In the Gambia, with the increasing rainfall variability together with other natural hazards such as bush fires, floods and storm winds, the Government decided to set up the National Disaster Management Agency (NDMA), with an Act and National Strategy. The Agency is responsible for managing post disaster responses and communicating disaster related alerts. However, the country is yet to have a national drought policy and plan.

Some of the issues on the current status of the country on drought preparedness include the following:

- The low institution capacities and resources of the existing Government bodies (Ministry of Agriculture and the National Disaster Management Agency) to deal with drought issues;
- Often drought/crop failures responses are coordinated through several Agencies, both Governmental and Non-Governmental with little central coordination;
- The inventions in terms of reliefs/aids are directed toward human relief and recovery;
- There is little or no post-drought/crop failures evaluation of responses undertaken;
- None existence a formal drought/crop failure contingency plan;
- The current early warnings can serve drought and famine but need to be instituted in a national drought policy (which does not exist) and a drought plan;
- Climate change vulnerability and risk assessments of sectors often carried out in every four years as part of the National Communication under the United Nation Framework Convention on Climate Change (UNFCCC);
- Drought/crop failure mitigation actions mainly focus on economic and crop diversification and poverty reduction measures, increasingly viewed as part of the development process with drought policy lacking.

As expected, a detailed organizational structure with institutional capacity and resources should be in place in country to coordinate all actions of government at various levels, as well as those of donors and nongovernmental organizations (NGOs). The following Table 5 shows key agencies that are involved in Drought Management.

Table 5: National and sub-National Agencies and their responsibilities in Drought Management	
National and Sub-National Agencies	**Drought Management Responsibilities**
Office of the Vice President; Ministry of Fisheries, Water Resources and National Assembly Matters; Ministry of Environment, Climate Change and Natural Resources Management (MECCNAR); and Department of Water Resources.	• Lead development of national and sub-national legislation and policy related to drought management in The Gambia; • Oversee and coordinate the science, technical and socio-economic requirements for the assessment of impacts and monitoring of the water resources before, during, and after droughts; • Administer the *National Water Policy and Act, the Climate Change Policy and Act (to be developed); National Disaster Management Policy and Act, the National Environment Policy and Act, and the Agriculture and Natural Resources Policy and relevant regulations.* • Responsible for the collection, interpretation and dissemination of standardized water resource information • The National Meteorological and Hydrological Services of the Department of Water Resources operate hydrometric, climate and water quality networks in partnership with other relevant agencies (NDMA, NEA, etc.).
Offices of the Regional Governors, Offices of Lord Mayors, Technical Advisory Group (TAG), Elected Representatives, (National Assembly and Councilors) and Traditional/Community Leaders (Chiefs, Alkalolus and Village Development Committees)	• Lead Regional Administration and Municipal Council Agency for drought coordination and response • Administer the *Local Government, Water Resources and other relevant Regulations and Policies at the sub-national level* • Operate the Hydrological, Meteorological and Disaster Management Centers to collect and interpret meteorological, hydrological and hydrological data to provide warnings and forecasts of stream and runoff conditions at the sub-national level • Monitor environmental, surface and ground water quality and groundwater levels at the sub-national level; • Conserve, restore and protect terrestrial and aquatic biodiversity habitats and ecosystems; • Communicate directly with various stakeholders, especially water users, about actions commenced under the National Drought Plan and during a drought phenomenon; • Consider, manage and protect water as a forest resource under the *National Forest Act, National Wildlife and Biodiversity Act and the Climate Change Policy and the Agriculture and Natural Resources Policy* • Lead agency for managing wildfire threats, especially during drought conditions; • Administer the *National Fisheries Act, Policy and Strategy* which protects fish and fish habitats
Ministry of Agriculture (MoA) and Ministry of Fisheries and Water Resources and National Assembly Matters (MoFWRNAM)	• Deliver the component of the National Drought Plan to eater and agriculture and provide timely information of the impacts of climatic variability on water supply and agriculture • Provide information on agricultural water use practices that reduce drought vulnerability and improve management during a drought; • Support agricultural industries and enterprises in meeting their water requirements for the production of food and other agriculture and natural resources products • Communicate with the broad stakeholders in the agriculture and natural resources sectors in relation to actions identified and being implemented in this National Drought Plan • Collect and disseminates information on irrigation, crops, soil, forest, biodiversity and livestock management during times of drought; • Regional Administration and Municipal level Livestock Officers provide guidance to Livestock herders and water suppliers on preparedness and response planning related to loss of water supply especially during drought occurrences' • Regional Administration and Municipal level Horticultural Officers provide guidance to Gardeners and Horticulturalists on preparedness and response planning related to loss of water supply especially during drought occurrences.

Ministry of Local Government and Lands	• Oversee local government activities under the *Local Government Act* • Provide water conservation resources and advice to local government water authorities, suppliers and end users (the communities); • Communicate with local government authorities and grass root level communities on the activities identified and implemented under this National Drought Plan
Ministry of Health and Social Welfare (MoHSW) and Health Authorities at the Regional Administration and Municipal levels.	• Provide policy support and guidance relating to the National Water Resources Act, especially as it deals with portable water for communities. • Administer and enforce the National Water Resources Act. • Regional Administration and Municipal level Rural Water Supply Officers of the Department of Water Resources provide guidance to water suppliers and local governments on preparedness and response planning related to loss of water supply especially during drought occurrences.
National Disaster Management Agency (NDMA), National Environment Agency (NEA), National Fire Services and National Security Services.	• Coordinate emergency support to local authorities as required to address community specific requirements under drought conditions • Office of Commissioner of Fire Services to receive information on predicted fire incidents and hotspots to enable to serve as First Responder to fire incidents under drought occurrences.

7.1 National Water Resources Monitoring and Impact Assessment

Monitoring of the quality of drinking water is a set of actions that are systematically adopted by public health authorities to ensure that the water consumed by the population meets the legislative requirements regarding the portability of water and does not represent health risks to humans.

Monitoring programs regarding the quality of water for human consumption should be developed according to different risk scenarios for each locality; however, some actions must be guaranteed during drought situations such as the following:

- Develop, in conjunction with those responsible for the water system, or via an alternative collective solution to provide a water supply, an action plan containing the definition of strategies and activities to minimize risk to health;
- Conduct sanitary inspections of the various forms of water supply, particularly of alternative solutions used for emergency supplies, such as wells, ponds, fountains and water trucks, and, where necessary, arrange for the temporary prohibition of such use until improvements are in relation to sanitary conditions;
- Identify other safe water when necessary, even if they are situated in other cities;
- Conduct monitoring of the quality of water for human consumption, prioritizing the most vulnerable locations;
- Provide sanitary barriers in conjunction with health monitoring and other partners to carry out the inspection of vehicles responsible for water supply, such as water trucks;
- Support health education actions along with other health professionals and those responsible for water supply using water trucks, particularly in relation to advising people about the proper handling and storage of water, the cleaning and disinfecting of water tanks, the treatment of water intended for human consumption in homes (filtration and the addition of two drops of 2.5% sodium hypochlorite to each liter of water or, in case of the unavailability of hypochlorite, filtration followed by boiling);

- Determine priority sources of water to supply water trucks, prioritizing the capture of water in water treatment plants using conventional forms of treatment and, where not possible, prioritize obtaining water from underground or surface water sources. Perform minimum levels of water treatment through filtration and disinfecting before distribution to the population;
- Participate in anti-drought committees in places where they are established;
- Request that those responsible for water systems, or alternative collective solution to provide water supplies, systematically monitor the concentration of cyanobacteria in the catchment points of surface water and improve the operational control of water treatment plants, including more frequent washing of fast filters to avoid the accumulation of algae and cyanobacteria in the filter bed, which can cause the release of cyanotoxins into the treated water;
- Maintain links with emergency units (hospital and emergency care) to warn of the possible increase in the number of cases of waterborne diseases, especially acute cases of diarrhea, and a potential increase in the number of cases of psychosocial and behavioral disorders.

Emergency situations such as droughts lead to discussions about universal access to safe water and sanitation, the use of new technologies to minimize waste, water treatment in emergencies, and water saving measures.

7.2 Development of New and Alternative Water Sources

The current Water Resources of country combined both surface and ground water. The Water Sources of the country are three; surface water, Rain Water and Groundwater. The first and last are permanent, whilst the second is seasonal and temporal in nature. The surface water is the river and the ocean, which as the first (River) is partly fresh and partly salty. The part of the river that connects with the Ocean about a length of 50km from the mouth is permanently salty. However, it fluctuates with the year from 50km in the mid the rainy season to 270km up stream in the mid of the dry season (March-May), the rest up to Senegal is fresh water.

This movement of salty and fresh water is called the saline front, greatly influenced by the annual amount of rains, more dependently on the on-set, length and end of the rainy season. Much of the central and eastern parts of the country rely on the river for rice cultivation, vegetable gardening and fruit trees farming and to some extent for domestic and Livestock water uses.

The second sources of water, which rain water is seasonal in nature (June – October) with inter-annual variation characteristics which are becoming more unpredictable with climate change. Meanwhile, its access and use as water source for domestic and agricultural is limited to few months (June – October) in the year. Despite the short period, it is significant and relevance for

the sustenance of the country's water resources as it recharges the ground water aquifers as well as controlling the saline front.

The third source of water for the country is groundwater which is found across the country at different layers and depth of aquifers. It is mainly the source of water for domestic use for both urban and rural settlements and agricultural activities such as vegetable gardening and small scale garden irrigation. Wells (some traditional, some modern concrete line wells) and boreholes (shallow and deep) are the main means of abstracting ground water for public and private uses.

With rainfall, the only means of recharge of surface and groundwater sources, any prolonged drought or deficient rainfall has the potential to affect these two water sources with serious consequences that can lead to water scarcity and the resulting hardship with probable conflicts.

Hence the need to develop new and alternative water sources is essential as a way of mitigating drought and deficient rainfall in the country through rain water harvesting from roof tops in residential areas; rain water harvesting from surface run-off through creation of reservoirs in low-land areas in the country; and improvement of potable water supply infrastructures in both urban and rural settlements

7.3 Water Conservation Practices/Public Education Awareness and Outreach

In general, the domestic uses of water in the country at the rural and urban setting are not regulatory through an act of parliament or bill. There is no enforcement on the daily quantity of water uses by person or household; it is left to individual households to regulate the uses of water. The domestic uses of water are more arbitrarily in the rural settlements than in the urban settlements, as in the later, users are very much concern of the costs as the usage will reflect on their water bills, hence they more rational in their daily uses. In the rural settlements, where much of potable water supply is communal own, with cost being shared communally or by local Governments, therefore with little rational on the uses of water or it, conservation. Meanwhile, local authorities has established a regulatory system through Water Management Committees in most of the rural water supply facilities to oversee the management of the facility that includes maintenance and sharing of the costs related to maintenance and repairs.

Meanwhile, as drought affects water resources and supply of potable water to the population, certain water conservation practices such those below could be considered:

1. To conserve and increase vegetative cover by reforestation to facilitate rain water infiltration and reduce erosion to increase groundwater quantity; the sources much of the domestic water supply;
2. Increasing vegetation around the natural ponds and open water sources to reduce losses by evaporation, thus increasing water availability for human and animal uses;

3. Introducing or enforcing regulations/measures on the domestic and agricultural uses of water to minimize arbitrary uses of water waste,
4. Conduct public sensitization on the rational uses of water, through use of television and radio programmes, workshops and peer group discussions,
5. Introducing a National Water Policy, accompanied with an implementation strategy and a strong regulatory framework if it does not exist or improving any existing one.
6. With the effects of climate change, the introduction of a national standardized well and borehole depths across the country to increase water quantity and avoid drying of wells in the dry seasons.

7.4 Legislation and Land Use Planning

7.4.1 Land Use Change

Until the middle of the 20th century, The Gambia's landscapes (Figure 8, 1975 panel) were extensively wooded, as part of the broad Sudanian wooded savannas that sweep across this latitude of West Africa. Today, vegetation density and diversity increases from east to west, as well as from the relatively drier north to the moister south. The Gambia's land cover has changed dramatically. The first change is the expansion of agriculture as the savannas are cleared for farming (see Figure 9 below). The second is the rapid urban sprawl of Greater Banjul Area (GBA, see Figure 10) and beyond[9].

Among The Gambia's semi-natural landscapes, savanna (which ranges from open shrub and tree savanna to dense wooded savanna) is still the predominant class by area. However, the maps in Figures 6 and 7shows that it is giving way to agriculture. In 1975, savanna occupied 51.3 percent of the total land area, whereas in 2013 it occupied 43.4 percent. Majestic gallery forests (and fringing riparian forests along humid bottomlands) once lined most of the streams and drainage ways. As a result rice cultivation, these gallery forests are being seriously depleted by clearing, or degraded by selective logging of large trees for high value wood. In 1975, 324 sq km of gallery forest were mapped. By 2013, only 185 sq km remained, registering a loss of over 42 percent. In contrast, The Gambia's mangrove forests have been fairly stable, with a slight increase in area from 602 sq km in 1975 to 654 sq km in 2013.

With the French introduction of groundnuts as a cash crop in Senegal in the 1800s, the production of groundnuts gradually spread across the border into western The Gambia. By the 1930s, the northern half of The Gambia had become the nation's main agricultural region. By 2013, The Gambia's western portion, north of the river, had become almost continuously cultivated, and the traditional system of bush fallow largely abandoned. At the national level, agriculture in 1975 was found on 21 percent of The Gambia's land area. The area increased to 23.9 percent in 2000 (Figure 8, 2000 Panel, and 28.1 percent in 2013 (Figure 8, 2013 Panel.

[9] https://eros.usgs.gov/westafrica/land-cover/land-use-land-cover-and-trends-gambia.html

Figure 8: Temporal Changes in Land Use and Land Cover of The Gambia from 1975 70m 2013

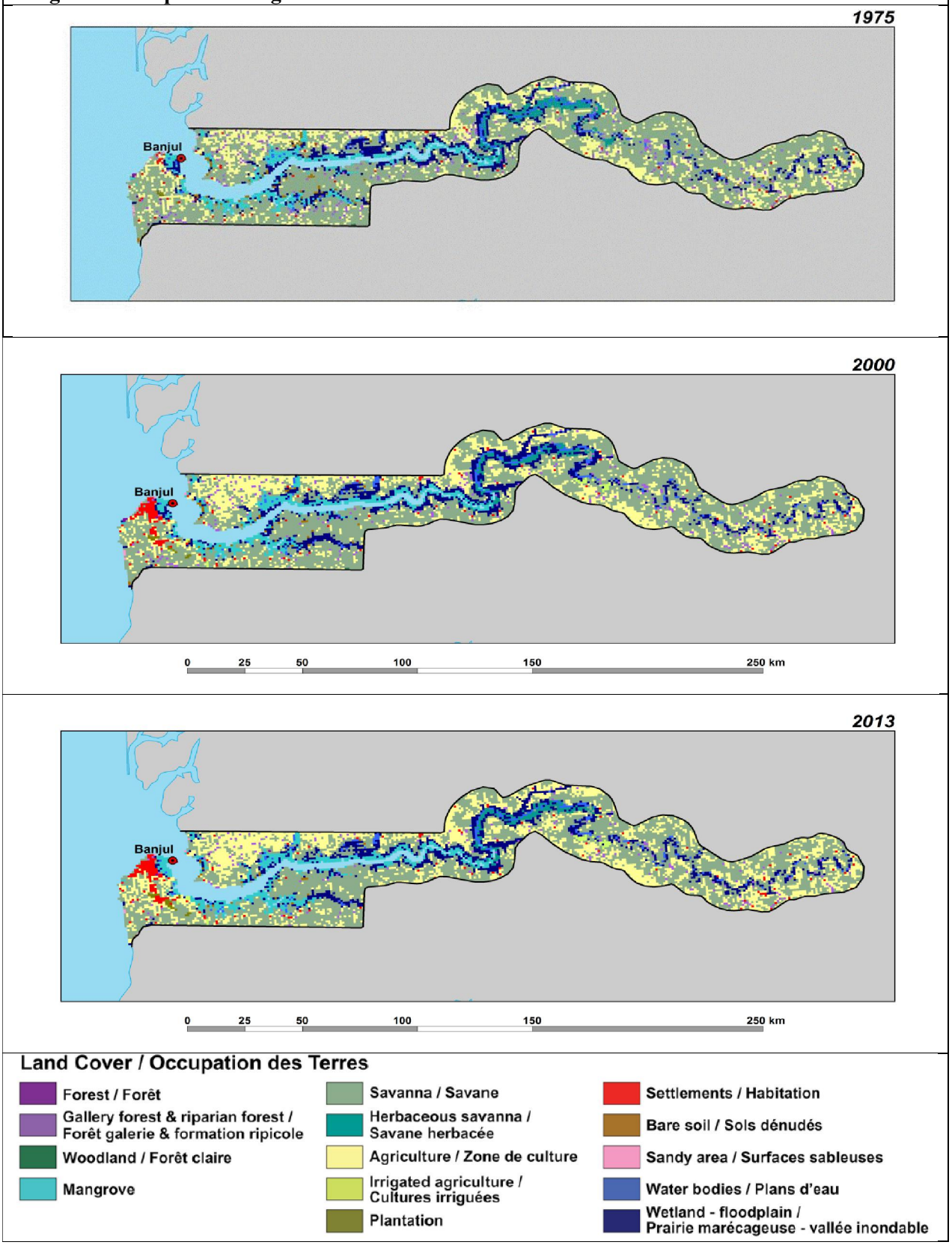


Figure 9: National Land Cover Baseline Map, January 2014

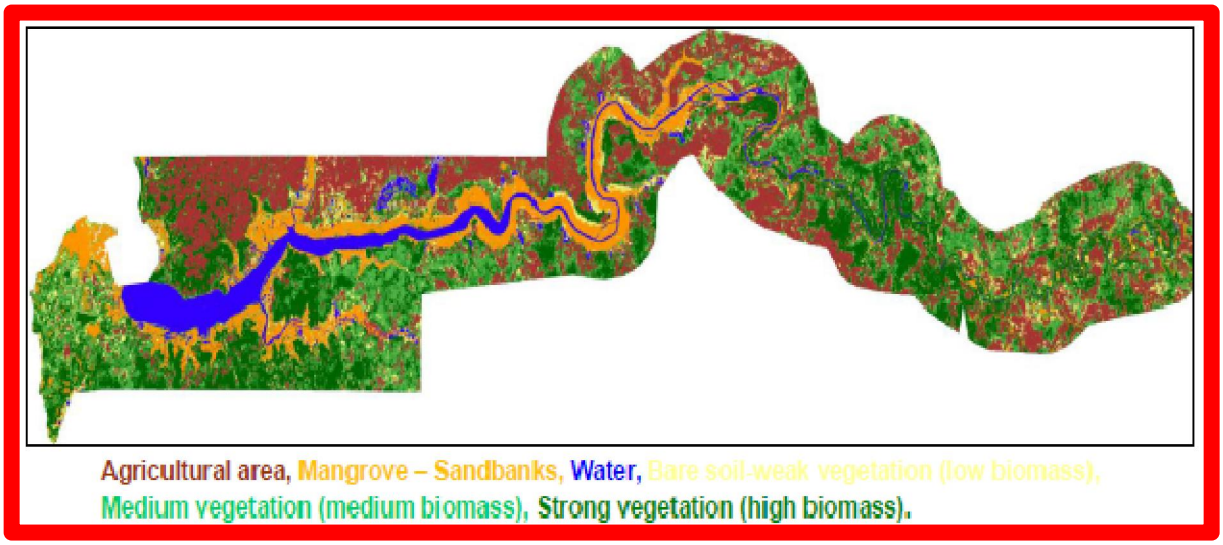


Figure 10: Panchromatic images taken from Earth Observation Satellites

7.4.2 Land Use Policy and Planning

The ensuing discussions in the previous paragraphs and maps (Figures 6 and 7) suggest rapid land use change in the country. Government is concerned by these challenges in land use change and wants to ensure sustainable planning and design by (a) working closely with the governments, local authorities, private sectors of urban and rural areas to design and implement a sustainable development framework and programmes; (b) building spatial and planning partnerships to integrate, harmonize and coordinate investments and social infrastructure(roads, electricity, schools, health care delivery); (c) revising the intergovernmental planning and development framework to provide for more specific and forward-looking planning innovations; and (d) encouraging land reform and private sector participation in Vision 2020.

The Government has recognized the alarming rate of degradation of forest resources, and has commissioned an institutional review, and an update of the Forest Policy discussed under Section 2 of this plan. The review reflected the poor implementation of the policy provisions resulting to under-achievement of the envisaged targets. The review showed that climate change impacts and response measures and traditional domestic energy have not been adequately addressed as key policy objectives.

The policy recognizes government's strategic shift towards poverty reduction and economic growth, which underpins vision 2020, the Gambia Environment Action Plan, Local Government Reforms and Decentralization, the National Development Plan, National Action on Desertification, etc. The provisions will accommodate government's decentralization process; and demand driven "bottom-up approach" strategy of the Local Government Act, 2002. This Act places management responsibilities on the Local Government Area Councils for a range of natural resources under their jurisdiction.

7.4.3 Legislature supporting Land Use Planning

While the 2002 Local Government Act provides a relatively comprehensive legislative environment, there is a need for review to mainstream climate change within the context of sustainable development; and to ensure that provisions and enforcement are in place to control the widespread problems of settlement that encourages the removal of vegetation cover and the top soil, thus exacerbating reduction in rainfall, dryness and drought conditions, especially the northern part of the country.

The most recent overview of the Banjul Urban Profile is found in the UN-Habitat study of 2012 (GOTG/UNHABITAT, 2012). This report underlines the importance of the three planning areas: Banjul itself, the Kanifing Municipal Council and Brikama Town in the West Coast Region. This demarcation of the Greater Banjul Area (GBA) underlines both the facts that Physical Planning (as defined by the Act) and Local Government (as defined by the Act) are the determining foundations on which to build a land use plan for the GBA. As regards GBA, physical planning is hampered by a number of key factors. Master Plans are outdated, problems exist with regard to land registration and acquisition, and land encroachment has become uncontrollable, despite the existence of the **State Lands Act** of 1990 – equally outdated, with no mention of climate change. For example, while the State Lands Act provides for 99-year leases, the Act makes no mention of what potential effects sea-level rise could have on the land-areas being leased. Furthermore, while the State Lands Act does reserve to the State the right to enter land for certain purposes, such as "removing stone, soil or other substances for construction or repair" no requirement is put on the State to take into consideration the potential environmental impacts of such or, at least, not under the auspices of the State Lands Act.

7.4.4 Land Resource Tenure and Legislation in The Gambia

Tenure is simply the term for the rights that individuals and communities have in land and other natural resources. The nature of these rights and the extent to which people have confidence that they will be honoured ("security of tenure") play a critical role in determining how resources are used. When these rights are framed effectively so that they provide secure expectations of continued access to resources, their users are more likely to take the long view, conserving and regenerating, rather than exhausting, the resource base. Alternatively, dysfunctional tenure rules can lead to resource degradation. For analytical purposes, it is often helpful to consider tenure arrangements in light of property-rights categories as in Table 6 below.

Table 6: Main tenure types in the Gambia (Amie Bensuda & Co. 2013)

Tenure type	Legal recognition	Registered	Legally transferable	Area (km2)	Population (millions)	Observation
Customary land	yes	no	Yes- w/ consent district / alkalo	9,084	0.792	
State land: freehold -urban	yes	yes	yes	537.7	0.453	Former crown land Banjul
State land freehold – forests, wild life park, nature reserves	yes	yes	no	385		Former customary land
State land freehold- acquired public land	yes	yes	Yes - if residential	n.a	n.a.	Expropriated for public interest
State land freehold- Tourism Development Area	yes	yes	Yes by state allocation through GTboard	n.a.	n.a	Lease from district / customary in 1970 for 99 years
Designated state land	yes	Possible when parceled	Yes with endorsement alkalo and chief	677	0.489	alienated customary land
Leasehold grants (by State)	yes	Yes – individual plots	Yes with consent minister	n.a.	n.a.	22,756 leases issued – conflict overlap with customary land
Sublease and tenancies	Yes	yes	Yes with consent land lord			
Deemed leasehold	yes	no	Yes w/ consent district and physical planning clearance	677 (incl leaseholds)	0,489	Kombo north – can be converted in formal leasehold

Conflicts around natural resources in rural Gambia are a constant characteristic of rural life. It is often assumed that conflicts are the consequence of dysfunctional customary tenure systems. Leasehold or freehold tenure systems are assumed to generate fewer conflicts than customary tenure systems. Another way to view conflicts and conflict-mediation processes is to consider how dispute resolution leads to change within the tenure system. Through the mediation process, old rules governing resource use maybe abandoned and new ones instituted. The resulting restructuring of tenure regimes may result in changes of the social status of the contending members, something that may or may not be judged equitable and fair. The outcome of the dispute-resolution process must be judged on a case-by-case basis. For some policymakers the existence of numerous rural conflicts, sometimes very violent in nature, justifies the need for major land reforms.

8. THE NATIONAL DROUGHT ACTION PLAN

8.1 Priority Implementation Actions

A variety of strategies and actions must be pursued to improve the resilience of the country's economy especially the sectors (agriculture, water resources, fisheries, forestry, parks and wildlife, etc) that are climate and rainfall dependent. These investments must be made as part of a comprehensive plan that includes, for the water resources sector, expanded water conservation, water recycling, storm water capture and reuse, local and regional water storage, groundwater management and other strategies to ensure water supply reliability and ecosystem health in The Gambia. For the forestry and parks systems, tree growing using indigenous trees which are climate and climate change resilient would work under harsh conditions including droughts.

Based on stakeholder consultations and literature review, the following key actions are relevant to the development and implementation of the Gambia National Drought Plan as indicated in Table 5 below.

1. Establish a Technical Drought Action Group to share information and develop recommendations to address the current and prepare for future drought conditions under projected climate change;
2. Compile and publish historical and current statistical information on drought impacts around the country as a snapshot in time;
3. Under scenarios of continuing and future (e.g. 10, 15 or 20 years) drought conditions, identify future vulnerabilities and impacts across sub-national and national jurisdiction and also across relevant sectors of the economy (water, agriculture, forests, wildlife protection, ecosystems, commercial industries, trade, etc.)
4. Design and operationalize an Environment and Climate Change Data Base at the National Meteorological Agency of The Gambia with Nodes at relevant departments that include National Environment Agency, National Disaster Management Agency, Department of Agriculture, Department of Forestry, Department of Parks and Wildlife Management, Department of Water Resources, Department of Livestock Services, Department of Fisheries and Department of Health Services.
5. Design and implement a Comprehensive Water Resources Management Programme for The Gambia that will respond to current climate and climate change related drought conditions at the sectoral, sub-national and national levels.
    5.1. Conduct a comprehensive study with results to inform the process of updating all natural resources and other relevant policies and regulations and facilitate long-term solutions for sustainability in the applicable natural resources, particularly, water management plans;
    5.2. Update the National Water Resources Master Plan including the design, promotion, facilitation and encouragement of innovative water supply

technologies such as irrigation that may be needed under a water-stressed economy due to projected climate change.

5.3. Policy and institutional reforms in the water resources sector (e.g., relocation of abstraction points, changes in pumping policies of deep wells and boreholes, flow regulation, licensing and permits for withdrawal of river water for irrigation and increase water column in wells);

5.4. Creation of new surface and groundwater storage and improved distribution systems at the Municipal and Regional Administrative levels to help address the nation's projected stresses in the surface and groundwater resources under changing climate related drought conditions; and

5.5. Development and implementation of medium and long-term water infrastructure and technology plans and strategies to ensure reliable and sustainable water supplies for both the economy and the environment; and improvement of distribution at the Municipal and Regional Administrative levels.

Table 7: NATIONAL DROUGHT PLAN – THE GAMBIA

Priority Administrative and Cross-cutting projects and actions to support Drought Management and Resilience under Changing Climate in The Gambia at estimated cost of US$44,670,000

Project/Programme Title	Goal and Objectives	Input and Activities	Outputs	Beneficiaries	Time Frame	Total Cost
1. Establish a Technical Drought Action Group to share information and develop recommendations to address the current and prepare for future drought conditions under projected climate change;	• Development of an interactive and collaborative process of drought management; • Provision of valuable insight and perspectives necessary for a more robust and comprehensive drought management plan.	• Design and implement an interactive, collaborative process involving key stakeholders in the country; • Provide valuable insight and perspectives necessary for a more robust and comprehensive drought management plan; • Participate in the development and review of the draft Drought Management Plan and provide feedback; • Guide and facilitate the means to collect and review data and receive feedback on specific aspects of the Plan; • Develop a representative and applicable drought definition, water use priorities, plan objectives, and operating principles;	Established Technical Drought Action Group to provide policy relevant advise to the Disaster Management Forum under the Office of the Vice President and the Agriculture and Natural Resources Working Group	MECCNAR, MoFWRNAM, MoHSW, MoLG&L; MoA; Offices of Regional Governors and Mayors; NAWEC, DWR	2019 - 2020	600,000

Project/Programme Title	Goal and Objectives	Input and Activities	Outputs	Beneficiaries	Time Frame	Total Cost
2. Compile and publish historical and current statistical information on drought impacts around the country as a snapshot in time;	• Desk research on previous droughts in The Gambia; • Gaps in means of management of droughts; • Lessons learned in drought and general disaster management; • Recommendations on improvement in Drought and Disaster Management	• Conduct desk research on past droughts in The Gambia; • Develop historical drought profile and information of The Gambia; • Identify any gaps and challenges related to means of implementation (capacity, finance, technology, etc) of previous drought events and management plans; • Compile lessons learned from management of past droughts; • Provide recommendations to improve the gaps, lift the challenges and address negative lessons and take advantage of positive lessons learned.	• Research report on past droughts in The Gambia; • Compiled gaps, challenges, lessons learned and recommendations on improving future drought management planning and implementation; Historical drought profile of The Gambia	MECCNAR, MoFWRNAM, MoHSW, MoLG&L; MoA; Offices of Regional Governors and Mayors; NAWEC, DWR	2019 - 2020	550,000
Project/Programme Title	**Goal and Objectives**	**Input and Activities**	**Outputs**	**Beneficiaries**	**Time Frame**	**Total Cost**
3. Under scenarios of continuing and future (e.g. 10, 15 or 20 years) drought conditions, identify future vulnerabilities and impacts across sub-national and national jurisdiction and also	• Development or adoption of existing climate and climate change scenarios at national and sub-national levels • Assessment of climate, climate	• Adopt existing or design climate and climate change and drought scenarios at the sub-national and national levels; • Assess and identify historical and potential	• Climate and climate change scenarios at the sectoral sub-national and national levels; • Climate change and drought related impacts on sectoral, sub-national and	MECCNAR, MoFWRNAM, MoHSW, MoLG&L; MoA; Offices of Regional Governors and Mayors; NAWEC, DWR	2019 - 2020	1,200,000

across relevant sectors of the economy (water, agriculture, forests, wildlife protection, ecosystems, commercial industries, trade, etc.)	change and drought related vulnerabilities and impacts; • Identification of relevant actions to address drought related impacts under future climate change and droughts; • Development of medium and longer term drought mitigation and response strategies	future drought impacts at the sub-national and national levels; • Determine the potential drought mitigation measures that address the potential future drought impacts; • Based on the identified scenarios, and where necessary, coin and expand the definition of drought beyond the traditional hydrological definition; • Develop drought stages, trigger points, and response targets that are based on the identified climate change related drought scenarios; • Develop national and sub-national Drought Management Plan based on the scenarios, impacts, and response measures and strategies; • Develop and implement medium and longer term drought mitigation and response strategies at the sub-national and national levels.	national economy. • Potential actions to address the identified climate change and drought related impacts			

Project/Programme Title	Goal and Objectives	Input and Activities	Outputs	Beneficiaries	Time Frame	Total Cost (US Dollars)
4. Design and operationalize an Environment and Climate Change Data Base at the National Meteorological Agency of The Gambia with Nodes at relevant departments that include National Environment Agency, National Disaster Management Agency, Department of Agriculture, Department of Forestry, Department of Parks and Wildlife Management, Department of Water Resources, Department of Livestock Services, Department of Fisheries and Department of Health Services.	• Automation of all climatic and sectoral observations and communication system:; • Provision of real time information dissemination to central and sectoral databases for the climate and other environment observations; • Adequately equipped (computers and software) climate and sectoral databases facilities required to manage data receipt, storage, access, visualization, climate service creation and dissemination; • Provision of reliable and stable internet services to all the operators of climate and environmental data bases;	• Asses and determine the outstanding observations platforms needed to satisfy effective monitoring of climate, climate change and environment observations, particularly drought and related impacts for climate resilience • Install comprehensive and automatic rainfall-measuring equipment, together with all essential support facilities, for real time monitoring and reporting on drought incidence, prevalence, impacts and cessation; • Undertake a gap analysis of sectoral observations required for monitoring and research on drought in particular, and climate resilience in general; • Support completion of the data rescue activities in DWR and provide support for sectoral data rescue in all cases producing digitized records in the databases • Install, equip and sustainably maintain full operational internet	• New and upgraded observation platforms and facilities for instrument and equipment storage, calibration and repair; • Operational and real-time observations delivery systems • Resilient database equipment for all observations sets, climate and sectoral, including quality control, input and output facilities, and visualization software; • Long-term on-line digitized records of climate, climate change and the environmental elements available and accessible to researchers and the general public; • Working and stable internet facilities available for the operations of the central and sectoral data bases.	• NMA,DWR, NEA; NDMA; DOA, DoF, all Natural Resources Management Agencies, National Associations and Forums dealing with Agriculture, Forestry, Water Resources, Livestock and others engaged in Agriculture and Natural Resources Management.	**2019 – 2021**	**750,000**

		services at DWR and at other government institutions and research facilities involved with climate monitoring and resilience.				
5. Design and implement a Comprehensive Water Resources Management Programme for The Gambia that will respond to current climate and climate change related drought conditions at the sectoral, sub-national and national levels.						**36,170,000**
Project/Programme Title	**Goal and Objectives**	**Input and Activities**	**Outputs**	**Beneficiaries**	**Time Frame**	**Total Cost (in US Dollars)**
5.1. Conduct a comprehensive study with results to inform the process of updating all natural resources and other relevant policies and regulations and facilitate long-term solutions for sustainability in the applicable natural resources, particularly, water management plans;	1. Put in place an enhanced enabling environment for achieving Drought Management and climate resilience in The Gambia; 2. Development, Revision and integration of climate change and disaster management, particularly Droughts into key water and natural resources policies, legislation, and institutions; 3. Initiation and/or development of coherent systems and strategies for capacity development on drought planning and management;	• Develop a Climate Change Act; • Comprehensively integrate climate change and drought management into National and Sectoral Development Plans • Revise key (Water Resources, Agriculture, Forestry, Parks and Wildlife, Environment, Disaster Management) legislation and their related regulations and strategies to mainstream climate change and drought management	• Better understanding and knowledge of the state of climate resilience governance and management systems, current gaps and developments • Climate Change Act prepared • National Development Plans prepared • Revised legislations, regulations and strategies • Developed framework for integrating climate risks and resilience sectoral policies and regulatory standards	• Sectoral Technical Teams and Sector Ministries and Climate Resilience governance and population; • Regional governments, Sector Agencies, • Policy and Decision-makers, and local communities	**2019 - 2021**	**920,000**
5.2. Update the National Water Resources Master Plan including the design, promotion,	• Reduction in rural poverty of women and young people; • Enhancement of rural incomes based on	• Promote and facilitate watershed development; • Build the technical and managerial capacity of the primary producers;	• An inclusive and well managed River Gambia watershed; • Efficient, effective and operational	NMA, DWR, NEA; NDMA; DOA, DoF, all Natural Resources	**2019 - 2020**	**750,000**

facilitation and encouragement of innovative water supply technologies such as irrigation that may be needed under a water-stressed economy due to projected climate change.	sustainable land and water management practices; • Expansion of the rural economy for employment generation; • Investments in water shed management and public, private and communal economic assets;	enterprises; and public and private sector agencies providing development support services. • Establish a strong institutional framework by engaging existing Government institutions, farmers" organizations, and credible service providers in the implementation process; • Develop the competence and confidence of communities to take on management responsibility for their local natural resource assets;	institutional framework at sectoral, sub-national and national levels; • Confident communities in terms of ownership and management of water supply facilities;	Management Agencies, National Associations and Forums dealing with Agriculture, Forestry, Water Resources, Livestock and others engaged in Agriculture and Natural Resources Management.		
5.3. Policy and institutional reforms in the water resources sector (e.g., relocation of abstraction points, changes in pumping policies of deep wells and boreholes, flow regulation, licensing and permits for withdrawal of river water for irrigation and increase water column in wells)	• Relocation of new boreholes away from heavily built up areas to minimize runoff and facilitate recharge of aquifers; • Revision of water pumping and abstraction policies from surface water sources, especially the River Gambia and its tributaries; • Revision of regulations related to licensing and permits for establishment of water points anywhere in The	• Revise the existing Water Act and Policy to provide legislation that fully incorporates the provisions and principles for the establishment and implementation of Integrated Water Resources Management (IWRM) approach in The Gambia; • Develop an institutional framework, plan and management strategy for water resources management in The Gambia; • Acquire and operate software and	• Revised Water Act and Policy; • Integrated Water Resources Management approach is operated; • Monitored surface and groundwater resources; • Rehabilitated and operational meteorological, hydrological and Hydrogeological monitoring networks; • Developed and operational water resources knowledge	NMA, DWR, NEA; NDMA; DOA, DoF, all Natural Resources Management Agencies, National Associations and Forums dealing with Agriculture, Forestry, Water Resources, Livestock and others engaged in Agriculture and Natural Resources	**2019 - 2021**	**1,500,000**

	Gambia;	technologies to monitor status of surface and groundwater resources on a continuous and sustainable; • Rehabilitate and improve the hydrological, hydro-geological, meteorological and water quality monitoring networks in The Gambia; • Develop and implement a water resources knowledge management information system; • Develop and implement a water sector related communications strategy.	management and communication strategy	Management.		
5.4. Creation of new surface and groundwater storage and improved distribution systems at the Municipal and Regional Administrative levels to help address the nation's projected stresses in the surface and groundwater resources under changing climate related drought conditions.	• Collection of rainwater using roof-top and surface-runnoff technologies and infrastructure; • Enhancement of available volume of freshwater for human consumption, animal watering and other livelihood uses (crop irrigation, fish farming, etc); • Reduction in polluted water sources due to increased storage before drought occurrence; • Improvement in	• Procure, install and operate rooftop (gutters, collection vessel, down-pipes, containers for settling particulates, storage container); • Use roof-top harvested water for non-drinking activities (horticulture, sanitation, animal watering, etc); • Procure, install and operate surface runoff water collection technologies (constructed reservoir and canals) for water harvesting; • Use runoff harvested	• Functional Roof-Top Rainwater Harvesting systems; • Functional Surface Runoff-water harvesting systems; • Groundwater recharge facilities; • Community established, owned and sustainably managed water storage and conservation technologies and facilities; • Reduced poverty and augmented community income and savings;	NMA, DWR, NEA; NDMA; DOA, DoF, all Natural Resources Management Agencies, National Associations and Forums dealing with Agriculture, Forestry, Water Resources, Livestock and others engaged in Agriculture and Natural Resources Management.	2019 - 2021	**13,000,000**

	employment status of the population; • Reduction in public and private expenditures associated with water infrastructure; • Reduction in exploitation and contribution to the stabilization of declining groundwater resources; • Utilization of appropriate water control, retention and supply technologies; • Promotion of commercialization, broadening and deepening local and national markets in terms of volume, quality and value addition.	water for non-drinking activities (horticulture, sanitation, animal watering, etc); • Construct and operate facilities for income generating activities (aquaculture and fish farming, vegetable and small scale crop production, rearing of livestock especially small ruminants, etc) in the periphery of the water reservoirs; • Encourage and facilitate full ownership and managemnt of the installed technologies and facilities; Establish and build the capacity of a Management Committee with membership from the communities sharining the established water resources technologies and facilities; • Identify and build the capacities of individuals and Associations in establishment and operations of business enterprises; • Encourage producers and value-adders to enter into productive dialogue with Government and other				

		private sector operators interedted and/or engaged in water resources management; • Procure, install and operate artificial groundwater recharge facilities				
5.5. Development and implementation of medium and long-term water infrastructure and technology plans and strategies to ensure reliable and sustainable water supplies for both the economy and the environment; and improvement of distribution at the Municipal and Regional Administrative levels.	• Implementation of Integrated Water Resources Management approach nation-wide; • Development of a Rural Water Supply Programme to attain 100% coverage in the Gambia; • Institutionalization of a robust village water supply maintenance mechanism; • Expansion of the density of observation boreholes to monitor the groundwater extraction rates and possible relocation of boreholes due to salt water intrusion; • Facilitation of water uses efficiency activities in disadvantaged communities and support programs that are locally cost effective and	• Design and implement the Integrated Water Resources Management (IWRM) approach; • Develop and implement a Rural Water Supply Programme to attain 100% coverage in the Gambia; • Put in place a robust village water supply maintenance mechanism to maintain the systems to a satisfactory and sustainable level; • Increase the density of observation boreholes for effective groundwater monitoring; • Increase access to safe drinking water and improved sanitation in the rural areas of The Gambia from the current level of about 70% to 72% for water supply and from 40% to44% for sanitation; • Provide 18 new boreholes to supply	Urban areas of the Greater Banjul area and towns in Regional Provinces Urban areas of the Greater Banjul area and towns in Regional Provinces and local communities Rural areas of The Gambia and towns in Regional administrative level and local communities Urban areas of the Greater Banjul area and towns in Regional Provinces and local communities	NMA, DWR, NEA; NDMA; DOA, DoF, all Natural Resources Management Agencies, National Associations and Forums dealing with Agriculture, Forestry, Water Resources, Livestock and others engaged in Agriculture and Natural Resources Management.	**2019 - 2024**	**20,000,000**

	contribute broad benefits to The Gambia.	piped water to medium and large size rural communities (with greater than 1000 people) and installation of stand-alone solar powered pumping units, elevated water tanks, distribution network and public stand-taps; • Rehabilitate and upgrade 4 existing water supply facilities to solar powered pumping units, elevated water tanks, a distribution network and public stand-taps; • Climate proof the Urban and peri-urban water and sanitation infrastructure				

8.2 Future Updates and Revisions

Generally drought is a consequence of inadequate availability of water. It is a weather phenomenon which is caused by insufficient rainfall; it is characterized by causing a sustained reduction of existing water resources in a given region, for a prolonged period of time; it is a period of low rainfall, or the lack of rain, in which soil moisture loss is greater than gain. Drought is considered to be one of the major natural disasters and its impacts are aggravated when it is associated with precarious livelihoods and the socio-economic vulnerability of a specific population. Disasters caused by prolonged drought affect millions of people, contributing to hunger, poverty and malnutrition, outbreaks of infectious and respiratory diseases, as well as influencing the human migration process. Drought can change the profile of morbidity and mortality of diseases, as well as having an impact on the supply of services that are essential to the quality of life of the public. This type of scenario can place immense stress on the normal routine of health services and infrastructures, particularly at times when they are most needed.

All the conditions described above are expected to increase and become more severe under projected climate change. Hence, it is critically essential that national and sub-national systems and institutions relevant for future drought management should be revised and updated to become more resilient and to promote resilient economies. The following will be relevant for the revision and updating of the national and sub-national systems.

1. National and sub-nation institutions and organization should have action plans in place, including scenarios based on the historic occurrences of droughts, an inventory of existing resources, and they should be able to identify what resources are required for a timely response to droughts under future climate and climate change scenarios..
2. It is necessary to strengthen the performance capacity of the structures under the natural resources and social sectors (e.g., Health) in order to develop timely responses to reduce the risk of drought across national and sub-national systems.
3. To reduce the impacts of droughts on the national economy, it is essential to develop actions to strengthen the ability of emergency services to deal with emergencies associated with drought in order to ensure the provision of services and the reduction of ensuing risks.
4. Studies and research must be conducted to produce guidance documents to support the participation of drought prone sectors and communities in emergencies for the management of information, for the evaluation of lessons that are learned, and to improve the work process both continuously and permanently.
5. Develop and strengthen the understanding of the behavior of droughts and associated disasters and to have prior knowledge of their geophysical, environmental, social, economic and political characteristics, as well as the health profile of the population in the affected areas.

9. IMPLEMENTATION OF THE NATIONAL DROUGHT ACTION PLAN

Implementation of the Nationa Drought Action Planof The Gambia (Section 8) is contingent on the availability and implementation of a Drought Policy and the National Climate Change Policy (NCCP), development and enactment of a climate change legal framework and a well-established institutional structure with well-defined roles and responsibilities of institutions and individuals. In The Gambia both the climate change policy and the institutional structure are in their infancy stages. There is no climate change law.

9.1. Drought Implementation Framework and Future Revision of the Plan

Given the cross-cutting and overarching role that policy, legislative and institutional reform plays in enabling The Gambia's climate change response, the following priority actions are envisaged for the implementation of the Gambia National Drought Plan.Many of the mitigation measures are geared towards the improvement of sustainable availability of water supplies under climate and climate change drought management systems and framework. The timelines indicated in the Plan and aligned to the National Development Plan (2018 – 2021) of The Gambia

The Drought Technical Working Group is responsible for monitoring and providing final recommendations on the timing of drought incidence. This Technical Working Group communicates relevant information to the Disaster Management Forum under the Office of the Vice President at State House. The Forum is responsible for the provision of advice and the Vice President, as Chair of the Forum, is ultimately responsible for the official declaration of drought and subsequent stages of a drought to the decision-makers and the general public. The protocol designed and operated at the sub-national and national levels is strictly followed during the implementation of the drought response plan.

9.2 Partnerships and an Integrated Approach

Collaboration with organizations, communities, and other partners is one of the most important and sustainable means to implement the Drought Plan in particular and generraly face the challenges of global climate change, accompanying hazards such as droughts and adapt to its impacts. The scale of climate change related droughts impacts far exceeds the ability of any one country, agency, or organization to effectively respond as a single entity. It is necessary to foster partnerships among national and sub-nation governments, organizations, private, academic, and non-governmental entities at local, regional, national, and international levels. Existing sustainable partnerships, which have evolved over time, are an ideal platform to support combined efforts towards mutual goals for drought response. Additionally, new partnerships specific to climate change related droughts should be forged to provide the enabling

environments for closer working relations on a range of science and drought response and mitigation tools for decision making.

Mechanisms will be established and made functional to engage and partner with key stakeholders in order to maximise effective climate change related drought mitigation and response programmes. These partnerships will be developed in such a way that government plays a supporting role to some of the proposed programmes and projects and a leading and oversight role in others in the Drought Plan. The integrated approach to addressing climate change needs to be highlighted throughout these partnerships and it is important that the proposed activities as part of the National Drought Plan are not limited to those actions that are managed by the public sector.

9.3 Financing and resourcing the Natioal Drought Plan

Finance for climate and disaster management refers to local, national or transnational financing, which may be drawn from public, private and alternative sources of financing. Finance is critical to addressing hazards, including droughts, because large-scale investments are required to significantly reduce impacts, notably in key sectors such as water resources, agriculture, fisheries, forestry and parks and wildlife. In accordance with the principles of Multilateral Environment Agreements(CBD, CCD and UNFCCC), developed countries are to provide financial resources to assist developing countries in implementing the objectives of the Agreements. It is important for all governments and stakeholders to understand and assess the financial needs developing countries have so that such countries can undertake activities to address climate change hazards including droughts. Governments and all other stakeholders also need to understand the sources of this financing, in other words, how these financial resources will be mobilized.

Equally significant is the way in which these resources are transferred to and accessed by developing countries. Developing countries need to know that financial resources are predictable, sustainable, and that the channels used allow them to utilize the resources directly without difficulty. For developed countries, it is important that developing countries are able to demonstrate their ability to effectively receive and utilize the resources. In addition, there needs to be full transparency in the way the resources are used in mitigating hazards and responding to to the impacts. Access to multilateral finances are getting difficult and limited.

The National Climate Change Action Plan (NCCAP) identifies the key priorities for The Gambia to successfully transition to a low-carbon, climate-resilient growth path whilst realising the ambitions of Vision 2030 of becoming a middle-income country. The realisation of these bold ambitions identified in the most of strategies recently developed by The Gambia will require substantial financial resources. To be successful, The Gambia will need to access resources from both public and private sources and from both within The Gambia and overseas. Raising the necessary capital is currently impeded by a number of barriers some of which include policy and

regulatory weaknesses, difficulties in accessing private finance and technical capacity shortcomings. However, the judicious use of public resources can play a key role in overcoming these barriers through improving access to finance or ameliorating some of the negative social and redistributive impacts that might otherwise be experienced from, for instance, higher electricity prices..

According to the National Climate Change Policy and for sustainability, Gambia is creating create a stand-alone dedicated National Climate Fund that is expected to have more clarity of purpose relative to greater budgetary support and would offer greater opportunities for alignment with national priorities (the 'ownership' principle). A National Forest Fund (NFF) also exists and funds activities related to implementation of the Forest Policy.The ability of the Government of The Gambia to absorb international public climate finance, as well as to use its own public resources expeditiously towards sustainable environment management could be improved.

At the international level, it is proposed that one avenue to funding the Gambia National Drought Plan is the Global Mechanism under the UNCCD, the multilateral funds under the UNFCCC (e.g., GCF, LDCF, SCF) and Bilateral cooperation funds (e.g., AFD French Development Agency, DANIDA, DFID, German International Climate Initiative, Global Facility for Disaster Reduction and Recovery, Nordic Climate Facility, World Bank Climate Investment Funds and World Bank Pilot Program for Climate Resilience).The Global Mechanism under the UNCCD supports Parties in translating the Convention into action and achieving Land Degradation Neutrality at the national level. The GM provides advisory services, promotes partnerships, demonstrates innovations, increases the effectiveness and efficiency of existing financial mechanisms, seeks to attract and channel investments from innovative financial sources such as climate change funds, private sector operations and micro-finance and translates cutting-edge knowledge into tailored, country-level action. The GM works with country Parties to the UNCCD and a broad variety of international and regional partner institutions to enhance their understanding of new financing modalities, and make sustainable land management (SLM) a priority in the country's domestic budget allocations.The Gambia will need to establish a coordinated strategy and operational capacity for accessing these Funds. It is also important to define institutional competence in measurable terms such as organisational mandate, staffing, resource budgets, information systems, pilot actions, even sectoral leadership and local champions.

10. MONITORING, REPORTING AND VERIFICATION OF THE IMPLEMENTATION OF THE NATIONAL DROUGHT PLAN

Monitoring, evaluation, reporting and verification will be critical activities of the implementation of this The GambiaNational Drought Plan. These activities are expected to ensure that implementation actions of the Plan are effective and put more emphasis on integration of climate change risks and responses into development frameworks and so go beyond the implementation of the project activities. These activities should be able to influence and effectively contribute to the achievement of sectoral, national and regional development objectives and goals and also complement national efforts and on-going and planned initiatives by other bi-lateral and multilateral development partners.

The overarching objectives of the Monitoring and Evaluation (M&E) System will be to track the transition of The Gambia to a low carbon and climate resilient economy. This will include:

1. Provision of a clear picture of the various drought mitgation and response measures;
2. Provision of an assessment of the effectiveness of these mitigation and response measures;
3. Applying a consistent approach to these assessments to allow for greater comparability;
4. Increasing co-ordination of climate change response measures;
5. Demonstrating impact of response measures to Government and development partners;
6. Increasing transparency on financial flows relating to climate and climate change related drought responses; and
7. Increasing awareness of historical, observed and projected droughts and their impacts.

It will be necessary to develop and apply an integrated framework for measuring, monitoring, evaluating, verifying and reporting results of response actions and the synergies between them. Effective implementation of the National Drought Plan is highly dependent on the internal "feedback" generated through monitoring, reporting and verification (MRV) processes. The framework must be able to assess the effectiveness of investment in the whole cycle of drought management because the mobilization and continuation of financial and technological support are contingent on the effectiveness of the MRV framework. National, bilateral and multilateral financial partners and other providers of finance need the results of MRV systems to validate the effectiveness of funds they provide. Therefore, securing further financial support for the implementation of the National Drought Plan will be dependent on the successful establishment and implementation of a MRV framework.

Such an ideal MRV framework for The Gambia should:

1. Build on existing institutions and skills;
2. Take into account the planned disaster management governance structures;
3. Provide guidance on the implementation of drought response actions, whether in the form of policies, projects, programmes or investment ventures;

4. Help The Gambia fulfil her international reporting obligations;
5. Demonstrate The Gambia's drought financing readiness; and
6. Provide a strong platform for attracting international climate finance flows from multilateral and bilateral development partners.

For effective and efficient monitoring, reporting and verification, criteria with quantitative and qualitative indicators disaggregated according to gender and covering various sectors and levels of the national economy need to be developed and utilized in the monitoring process. Particular attention should be paid to coverage of the activity whether it be at the grassroots level community, sub-national and/or national; agriculture, water resources, ecosystem, etc; local level, middle-level and high-level decisions-makers and national policy-makers. The monitoring and evaluation criteria must also include the assessment of the impacts of the activity on the community and at the national levels such as change in knowledge and awareness on derought management, improvement in the livelihoods and influence on decision and policy making at the local and national levels.

Indicators to be developed for the MRV system should include for example institutional adaptive capacity indicators that provide measures of the effectiveness of national initiatives to build institutional capacity to address the challenges of drought hazards at the county level such as the number of Ministries and Departments, Civil Society Organizations, Youth and Women Groups, Media Agents, etc, that have received training for staff operating at district/county and national levels on the cost and benefits of the effective drought management. The indicators should also include vulnerability indicators that may be a mixture of process-based and outcome-based indicators and should measure the effectiveness of local and national level initiatives to reduce vulnerability to drought risks at the national level. Such indicators include number of people (disaggregated according to gender) permanently displaced by droughts and the number of households that are in need of support such as pipe-borne water and food aid.

11. CONCLUSIONS AND RECOMMENDATIONS

The strategies and activities proposed in this National Drought Plan are intended to sustainably address the historical and projected challenges The Gambia will face and enhance resilience of the economy and citizensunder increase droughts due to the projected climate change. The design and implementation of this National Drought Plan set the framework for future strategies and actions to alleviate the adverse effects of climate change induced droughts, to raise awareness within the local population about the challenges ahead and to establish Government's commitment to work in partnership with the wider community and development partners to achieve a more sustainable future for the country and her citizens.

As global greenhouse gas emissions are continuing unabated, climate change impacts including more frequent and intense droughta, are likely to intensify an already precarious situation into the future. If no action is taken to reduce or minimize expected drought impacts, the costs to society and the economy will be immense. The The GambiaNational Drought Plan therefore identifies the sectors that are most vulnerable to climate change induced drought impacts and proposes interventions to mitigate and respond to these impacts, while promoting climate change-resilient production systems.

Activities identified in the National Drought Plan require substantial additional and adequate financial resources for their implementation, and funding is therefore required from both domestic and international sources. Partnership must be forged and all stakeholders should mainstream climate and drought management and responsive activities in their programmes and projects.

While The Gambia stands to benefit immensely from the advanced technology of developed countries, efforts should be made to support local technology generation and application through institutional capacity building programmes. Consequently new and additional resources are needed to support The Gambia's research, development as well as strengthen academic institutions that are competent enough to identify and predict drought incidence, time-wise persistence and termination

Tracking and measuring progress towards achievements in effective drought management in The Gambia will not be easy because the links between the biophysical, economic and social relationships are not clearly understood. Ultimately, the objective would be to institute an ongoing process of policy monitoring and evaluation which could become a tool to increase collective knowledge about how policies contribute to drought management under a hotter and dried climate.

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